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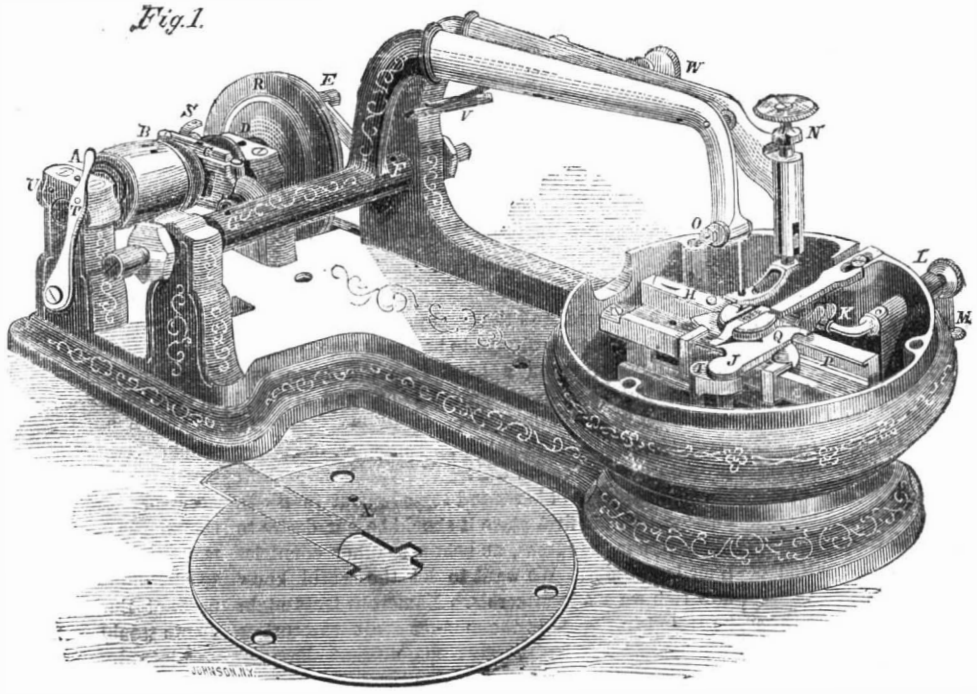
Improved Sewing Machine.

We have, on former occasions, set forth the great benefits to result from the invention of the sewing machine, and the revolution that was to be wrought in the extended branch of industry in which it was to be employed. These anticipations are being rapidly realized, and it is left for us now to chronicle the successful progress of the machine, and present from time to time illustrations of its increasing efficiency.

Immense warehouses for the sale of this great American invention line the principal avenues of our cities and large towns. But it is not only in our own country that it is to find favor—no impediment of language or custom can ever prevent its adoption in any region of the civilized world. No limit, therefore, can be placed upon the extent of the business yet to grow up for it in every quarter of the globe. Its great importance has necessarily attracted the skill and ingenuity of the country to increase its efficiency or render it cheaper. Every improvement of either kind is sure to yield a rich reward. A great many varieties are, therefore, now offered to the public, all having some claims of merit. The machine here illustrated combines many of the latest improvements. Besides the rapidity of its work and the variety of its movements, there is claimed for it an exactness of action in all parts, even in the hands of an ordinary operator, that removes a great difficulty often urged against the sewing machine.

Fig. 1.



THE FLORENCE SEWING MACHINE.

The distinguishing features of this machine are as follows:—

The main shaft runs in bearings, A and D; the crank which drives the needle is part of the shaft, and is inclosed by brass boxes, and slides in an oblong opening, C. The arm plays in the centers, F and G; all the wear can be taken up by this method. The shuttle, which is shown in its place, back of J, is driven by a long connecting rod, E. The feed motion is driven by an eccentric, B. The wheel, R, is pinned firmly to the main shaft, thus securing the machine from any possibility of getting out of time or losing its adjustment. The shuttle is kept perfectly true in its course, and is prevented from missing stitches by a projecting ridge on the face of the race, as shown at P; there is a corresponding groove in the face of the shuttle just over its point (see Fig. 2), so that the needle thread cannot pass on the wrong side of the shuttle.

The feed motion in this machine is one of its novel features, being reversible. The thumb screw, L, moves the fulcrum, K, in a slotted lever, passing the center of its motion either way; when above the center—as shown in the engraving—the fabric will move from right to left; when below the center, the fabric is carried from left to right. The greater the distance the fulcrum is moved from the center, either way, the longer the stitch is made. A small set screw, M, stops the thumb screw in any position, and allows it to turn in either direction the same distance, so that the feed can be instantly reversed, and the stitch remain the same length.

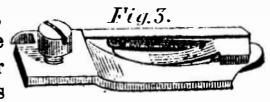
The method of taking up the slack thread is by a deep cut in the wheel, R. As the needle enters the fabric, the thread drops into the cut, thereby allowing the slack thread for the shuttle to pass through. As soon as the needle is drawn out of the fabric the solid part of the wheel takes up the slack, and, at the same time the hook, Q, moves forward and draws the shuttle thread firmly, thereby making the seam uniform and very regular over any thickness of fabric.

A great difficulty has heretofore been found in adjusting the shuttle, so that the tension of the thread would be uniform. In Fig. 2 is seen the construction of the Florence shuttle. The plate, B, turns on pivots, and is pressed by a spring upon the surface of the thread on the bobbin, A, and rests there until the thread on the bobbin is used up, producing a perfectly even draft on it. The thread passes from the bobbin around the curve on the back of the plate, B, which causes the thread to be drawn from every part of the bobbin with equal draft. There is a screw on the top of the shuttle, by which the pressure of the spring on the plate, B, can be adjusted if necessary.

Fig. 2.

The lever shown at A, Fig. 1, is for the purpose of making a stronger stitch than usual, and has two positions. When in position, as shown in the engraving, it has no connection with the working parts of the machine. When pushed back to the point, at U, it causes the feed motion to be stopped at each alternate stitch; the needle is thus caused to operate twice in one place, doubling the stitch, and making it more elastic and stronger than ordinary. This is done by means of a small lever with its fulcrum back of the screw, which secures the shifting lever; it swings so as to stop the feed bar every other stitch. The oscillating of the lever is caused by a groove in the end of the pulley into which a part of the lever fits. It is difficult to describe this arrangement without an enlarged section of the parts.

Fig. 3.



The whole machine is neat and compact, being entirely above the table, and is not liable to soil the dress of the operator. The round plate that covers the top of the machine is removed to show the parts inside; the machine runs equally well with it off, but it is always on when used to keep dirt and dust from the inside. The form of this plate is the most convenient for handling the work, the needle being in the center of it. It is a very quiet running machine, and is easily managed. The tension of the thread being self-adjusting, it is capable of running over all kinds of work ever required in a family, from the finest handkerchief to the heaviest overcoat. The reversible feed enables the operator to quilt right and left—in fact, in any direction—without stopping the machine to turn it; it also fastens the end of every seam merely by touching the thumb screw. The needle cannot be set wrong.

Each machine has a complete outfit of tools and fixtures, including Jenck's patent hemmer, Fig. 3, which will turn any width of hem or fell with great ease. It is entirely different from every other hemmer, and is attached to the cloth-presser foot by passing the head of the screw into the slot in the foot from the right hand and tightening the screw.

The principal points of this machine are secured by patents dating from October, 1855, to July, 1863. Further information may be obtained of the Florence Sewing-machine Company, No. 505 Broadway, New York.

NEW GREEN AVANTURINE GLASS.—M. Pelouze recommends as a beautiful variety of ornamental glass one composed as follows:—Sand, 250 parts; carbonate of soda, 100 parts; carbonate lime, 50 parts, bichromate of potassa, 40 parts. This glass melts with perceptibly greater difficulty than that without the bichromate, is of a deep green color, and full of small spangles, crystals of oxide of chrome, which sparkle with a brilliancy inferior only to the diamond. As it resembles in character the Avanturine glass of Venice, M. Pelouze proposes for it the name of Chrome Avanturine.

ELECTRIC BUOY.—M. Duchemin proposes to construct Ampere's electric boat upon a sufficiently large scale, and to use it as a warning buoy on shoals, etc. He proposes to float, by means of cork, a carbon cylinder within a hollow cylinder of zinc, the connecting wire to be made to strike a bell in the usual way. He speaks of small cylinders, but gives no suggestion as to the size necessary to operate a bell large enough to be heard at any distance.

A PHYSICIAN writes from the Great North West to Dr. Hall, of this city:—

"I consider the *Atlantic Monthly* and the SCIENTIFIC AMERICAN almost as essential as my bread and potatoes; and from all that I have seen and heard, I am led to believe that I might soon learn to consider *Hall's Journal of Health in the same light.*"

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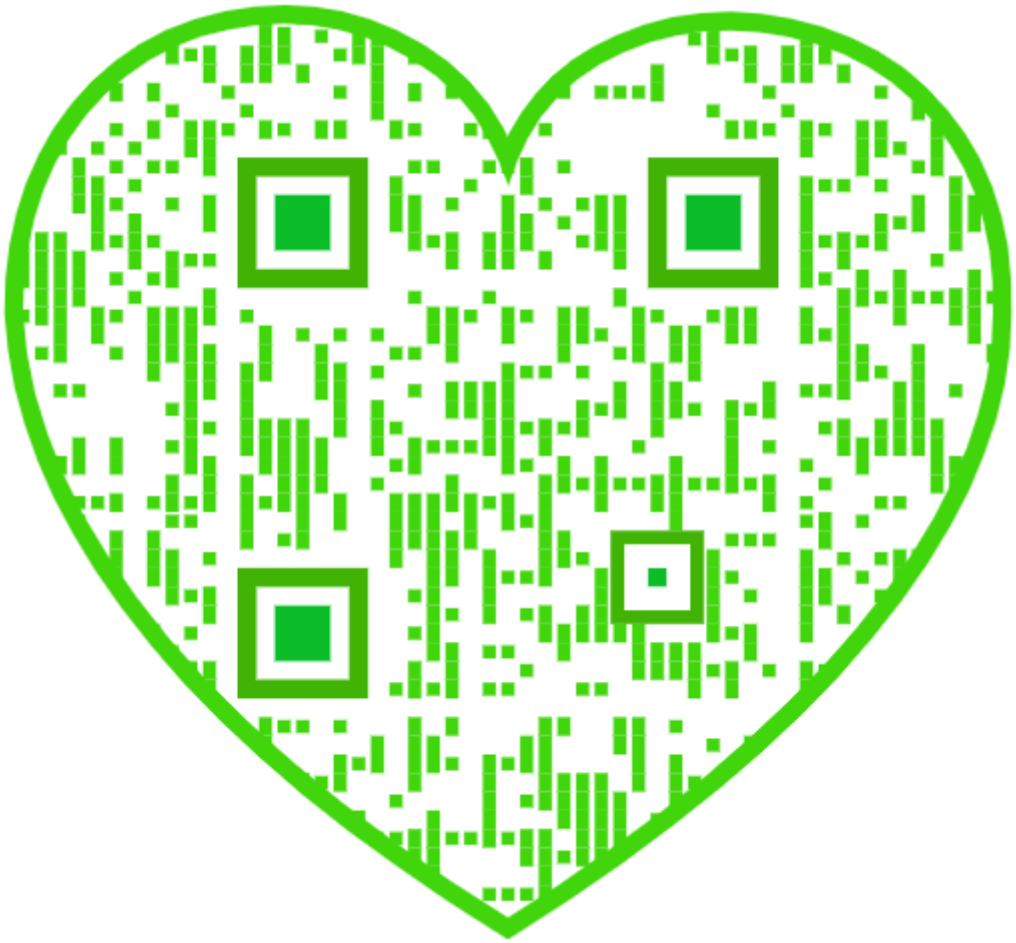


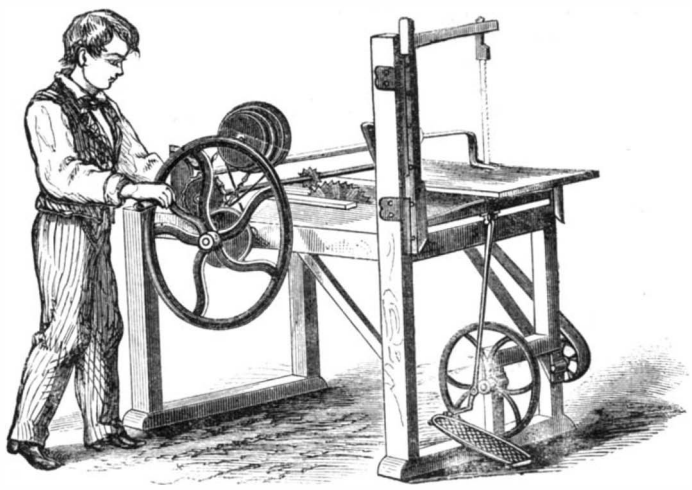
Improved Hand Saw-mill.

The machines for sawing up lumber by hand power are very convenient—indeed, they are indispensable in small shops, where there is no power to be had.

The one here shown has had great popularity among mechanics, and numbers of them have been sold. It consists of a circular saw fitted to a bench as usual, and provided with a self-feeding arrangement, whereby the stuff runs up to the saw without any assistance from the workman other than furnishing the power to drive the saw. This part of the machine is intended, principally, to split lumber, but as it often happens that ornamental work would be done if the proprietor had facilities, another attachment is provided, by the aid of which all kinds of fancy sawing can be executed. The detail referred to is the jig saw, shown at the end of the bench. This saw is driven by foot power, which leaves the hands quite free to turn the work in any direction.

One man, or a strong boy, can, with perfect ease, rip a two-inch hardwood plank. or a three-inch pine, in one-third the time that it takes with the ordinary handsaw; and, besides, the most inexperienced apprentice can, with this machine, saw truer and straighter than the best journeyman can with the handsaw.

The first premium was awarded this machine at the Fair of the American Institute, the New York State, and other Fairs. These machines are sold for $100 complete; and further information can be had by addressing Wm. H. Hoag, Box 4,245, New York Post Office. State and county rights for sale. Machines can be seen in operation at No. 40 Cortland street, New York.



TALPEY'S HAND SAW-MILL.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Dec. 14, 1865, the President, Prof. S. D. Tillman in the chair.

METALLIC VEINS.

The President remarked that Dr. Stevens had just returned from a geological visit to Nova Scotia, and would give a brief description of the formation of metallic veins.

Dr. Stevens:—Metallic veins are divided into three great classes—first, those that are parallel with the strata of the rocks; second, those that cross the planes of stratification and have parallel sides or walls; third, those that cross the strata and have converging walls. The iron mines of New Jersey are samples of the first class; the gold mines of California are samples of the second class; and the lead mines of the West are samples of the third class.

There are three ways in which mineral veins may be formed—they may be injected in a molten state into cracks in the rocks; they may be infiltered while in solution; or, in the case of mercury, zinc, and other volatile metals, they may rise in the form of vapor into the crevices, and be deposited in the solid form on cooling. Trap, in the sandstone, is a sample of the first; lead and copper veins are samples of the second; and the quicksilver mines of new Almaden are samples of the third—both the sulphur and mercury were doubtless sublimed, and entered into combination while in the state of vapor.

The magnetic iron ore of New Jersey is found in layers between the strata of the gneiss rock. The accepted theory of the formation of these veins is, that the iron was at one time in solution in shallow ocean waters, and by chemical action was precipitated to the bottom. The precipitate at first was nearly pure, but later it was mixed with the silex, alumina, and other constituents of gneiss; the vein, consequently, is sharply defined at the bottom, while at the top it fades away imperceptibly into the gneiss rock. After the deposit was formed, the mud was slowly crystallized into gneiss, and the iron ore also gradually assumed its present crystalline form. Subsequently, by subsidence of portions of the earth's crust, the strata of the rocks were tilted at various angles—sometimes to a perpendicular position, and sometimes they were even turned completely over, so that the original bottom of the vein is now on top.

The second and third classes of veins, which cross the strata of the rocks, always have both sides clearly defined; but it is characteristic of those lying between the strata, to have but one clearly defined wall, with the other side fading away in the manner described.

FRENCH EXHIBITION OF 1867.

The President invited Professor Joy, of Columbia College, to introduce the subject of the French International Exposition.

Prof. Joy said, that he consented to be present, to introduce the subject, but would not occupy much of their valuable time. The Polytechnic Association was the best place he knew of to introduce any new idea, as here it would be thoroughly sifted, shaken to pieces, as it were, and the good parts separated from the bad. There are always to be found here, persons who will pounce upon a good idea the same as a hungry dog would upon a good bone, and if a bad idea is presented it is closely scrutinized, and the weak points made manifest. Therefore, it is very proper that the French Universal Exposition for 1867 should be spoken of here, and tossed about in a discussion. In the first place it should be our desire to develop our resources, and show to other countries their immensity. We want to let the world know how rich we are in minerals. Numerous facts might be stated in regard to the manner great enterprises originated. He had seen a magnificent diamond which was presented to Baron Von Humbolt by a gentleman whose land he visited. On examining some pieces of rocks on it, the Baron said that there should be diamonds in the vicinity, and so there were. This diamond was the first one found there and the owner justly presented it to the Baron. We, in this country, do not know the value of our ores. There are persons who are in search of things that we have, but we do not value them, because we do not know what to apply them to, but when made known to others, they would say, "This is what we have been so long in search of;" and hence an article heretofore valuless becomes one of vast importance. There is gypsum, commonly called plaster of Paris, from the idea that it could be found only in Paris. Now this mineral might as well be called plaster of Nova Scotia, or of Michigan, where there are immense beds of it. About 1844 gutta percha was first brought over to this country. There were then no International Exhibitions, such as we have now; and most of us can recollect how hard it was to bring it into use. Now we could not carry on our sub-marine telegraphs without this article. The Professor then exhibited a piece of metal on a strip of paper about a quarter of an inch long, and an eighth of an inch wide. It is, he said, a metal called indium, and this was, perhaps, the largest specimen in this country. There are ten chances to one that some one will send specimens of minerals to the Paris exhibition that will contain a large percentage of this metal. Cœsium is a metal that will probably become very valuable in medicine. It may also be accidentally found combined with other metals. He had known a gentleman who found a mineral that contained 30 per cent of cœsium. By sending varieties of our minerals there and showing our vast resources, in this respect alone there is not the slightest doubt but emigration would be much hastened to this country. There are certain branches of trade in Europe which require articles that we have in abundance, but which are not known there. We will lose golden opportunities for increasing our national wealth, if we do not take advantage of the great means of making known our vast mineral and other resources which this Exhibition affords. He recollected, while in Germany, having seen two copper wires which were exhibited in a museum of Gottengen, and being curious to know their history, he was told that in 1832, after the discoveries in electricity by Hans Christian Oersted, they put up wires between two buildings, and by means of a dial plate they were enabled to telegraph to each point. Soon after this, permission was asked of the authorities to put up wires across the city. This matter gave rise to considerable discussion in the council, but after the lapse of some months the privilege was granted. The wires were put up, and shortly after they were struck by lightning, which melted them and the pieces he saw, had fallen and burnt through the umbrella of a lady who was passing at the time. This was a fact, as he knew the lady to whom this happened. This incident he related to show how slow they were in those days, and how difficult it was to carry out anything new.

Our mechanical industry should also form a prominent feature in this Exhibition. During the last few years we have opened the eyes of the people of Europe very much to our immense resources in this respect; but with a little exertion among us we could astonish them still further. The articles we have sent there in former years have not been characteristic enough of us as a nation. With the exception, perhaps, of McCormick's reaper, little else has been of that nature which we might expect would open to us a market. It would be a great blessing too, if we would send our tools over to Europe. It is surprising to see what kind they use there. Much unnecessary labor and time might be saved to them if they were made aware of the excellence of those we make and use here. The disadvantage in this respect is not so much felt in England, but in other parts of Europe our agricultural tools and implements would immensely benefit them. If we could also introduce among them, our American stoves, grates, or even our wooden clothes-pins, we would be doing them and ourselves an advantage. He remembered well, when a student in Paris, how he suffered in winter from the cold, not having either stoves or grates there. Grates are about being introduced there now, but they have hardly begun to use stoves. A vast business in this article alone could be carried on if their advantages were made fully known. There are hundreds of other articles which we have that could be made of much value to them.

The immense advantages to be derived from exhibition of national industry, can be seen in the increase of the exports of France since their display in the London Exhibition. Their export trade during the last year amounted to 581,000,000 dollars; and there is no doubt but that, after the coming Exhibition, in 1867, trade will increase many millions.

A New Gear Cutting Engine.

Messrs. J. R. Brown & Sharpe, of Providence, who employ about 200 hands, have recently constructed a gear-cutting engine, with a very perfect index plate. The divisions on their index were obtained from a dividing engine, made by Troughton & Simms, of London, expressly for graduating astronomical and surveying instruments. The head is heavier than usual, to insure accuracy. The arbor is turned form a cast-steel forging, weighing 60 lbs. On the top of the index plate a circle of copper is inserted near the outer edge, on which are 432 divisions, copied from the plate of a machine containing 4,320 divisions. The marks made on this circle can hardly be seen by the eye, and to center each plate upon the shaft two microscopes of a magnifying power of 27 times, and fitted with cross hairs, are used. These micro-

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scopes are placed one on each side of the center of the circle, and eight heavy set screws, in the hub of the index are altered till every division of the circle and its opposite coincides with the cross hairs in the microscope, and every tooth on the edge of the plate is cut, when the oposite divisions are coincident with the microscope. It is an ingenious machine, and supplies to our machinists a long-looked for desideratum.

THE FOOT LATHE.

Number 3.

To suit different kinds of work, as previously stated, various tools are needed, but the reader must not expect to see them all illustrated in these articles. It would take much more space than we could spare; besides, the workman will see, as he learns what tools he needs, and makes them for himself, which will be of more advantage to him than engravings could be. The tools here shown will be found very useful in different places.

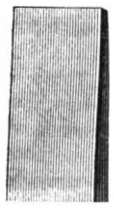


Fig. 8.

Fig. 8 is the end of a thin-edged, flat scraper, and is chiefly to be used on brass work. It may be of any length and size, but for small lathes, and light work, it is cheaper and handier to make it of thin sheet steel, one-eighth or one-tenth of an inch thick, and to form the reverse end into a round nose, or half-circle scraper.

It often happens that fillets or hollows, occur, as in finishing ornamental brass work, in connection with flat surfaces. By having such a tool as this the necessity of laying one tool down and picking up another is obviated, for the two are combined in one. For iron work it is customary to use a heavier and thicker tool for finishing. As in Fig. 9, the front edge is slightlyraised or concave, to make it sharp and hold a cut well. All turning tools for finishing iron are made thicker than those for brass, and should have lips or curved cutting edges. Such tools cannot be used for brass as they are too sharp; the edges jump into the metal and spoil the work.

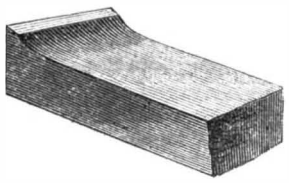


Fig. 9.

A tool for scraping brass work of some kinds is made as shown in Figs. 10 and 11.

Fig. 10.

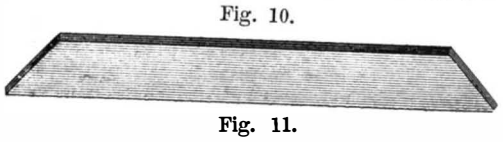


Fig. 11.

There is no occasion to make the ends at different angles, except the convenience before stated of having four cutting edges on one piece for any angle can be easily given by the position of the hand or the direction of the rest. These tools here alluded to are only to be used when the job has been all turned true and the scale removed; they *scrape*, merely, they do not cut.

Such tools sometimes save a few steps at a critical period; that is, when the tool is well set and in place, so that the work is done better and more expeditiously. Apart from this consideration, there is the chance of cutting or injuring the hands by the proximity of sharp edges. Under the control of an expert, however, there is little danger from this cause, as inspection will show. Skillful men, that have worked a life time at their trade, have few marks or scars on their hands, as a general thing.

When these scrapers are used on cast iron, or, indeed, on brass of a peculiar composition, they sometimes "chatter," as it is called, and leave the work full of deep, unsightly marks, like those on the edge of coins. The cause of chattering is the rapid vibration of the tool, so that it springs away from and against the work with great rapidity, leaving traces of its edge on the work. Chattering may be prevented by putting a piece of sole leather on the rest, between it and the tool.

The tools with long handles are chiefly intended for heavy work, or that which requires both hands to the cut, but there are smaller tools than these used by amateurs, wherein the common file handle, or one like it, only a little longer, is employed instead.

CHASING AND SCREW CUTTING.

In an engine, or power lathe, all screws are cut by trains of gears, as mechanics well know, but in the hand lathe, which was the first machine, screws, both male and female, must be made by chasers or hubs, both inside and outside. The chaser itself must be made first, however, and that is done by a simple tool called "a hub."

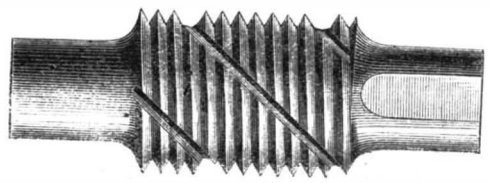


Fig. 12.

The chaser is first forged in blank, for an outside chaser, as in Fig. 13, and as in Fig. 14 for an inside tool. It is then filed up and held against a hub, shown in Fig. 12, running in the lathe. This rapidly cuts away the chaser blank and forms the teeth in it perfectly. The lines across it are spiral grooves, cut completely round from one side to the other, so that the hub cuts the blank like any other tool.

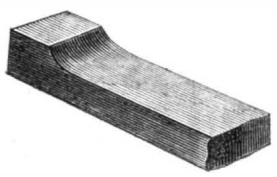


Fig. 13.

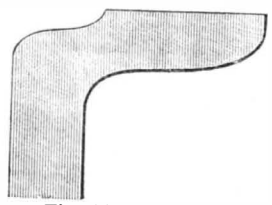
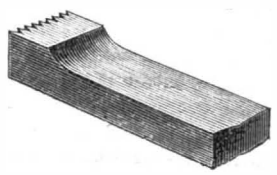


Fig. 14.



This is the chaser, Fig. 15.

[To be Continued.]

UNITED STATES NAVAL OBSERVATORY.

We are indebted to Captain J. M. Gilliss, Superintendent of the U. S. Naval Observatory, Washington, for a copy of the report, with the observations made in 1863. It is a large quarto volume of 495 pages, the first twelve being devoted to a description of the observatory and instruments, and the remainder to tables of the observations. A few of the statements may prove of interest to a portion of our readers.

HISTORY OF THE ESTABLISHMENT.

In August, 1842, a law was enacted authorizing the erection of a "Depot of Charts and Instruments," and the building was completed in September, 1844. In December of 1854 the Honorable Secretary of the Navy directed that it should thereafter be styled the "United States National Observatory and Hydrographical Office."

The enacting law authorized the President of the United States to locate the building upon any public ground within the District of Columbia not otherwise in use; and the site assigned by him is the square originally designed in the plan of the city of Washington for a National University. It is on the north bank of the river Potomac, in the southwestern part of the city, and contains about seventeen acres, of which the highest point is one hundred feet above the river, the ground sloping thereto both on the south and on the west sides. It is inclosed on the east, south, and west sides by a brick wall, and on the remaining one by a picket fence.

The Observatory buildings consist of a central edifice fifty feet square, with wings to the east, west, and south. The central building is two stories and a basement high, with a parapet and balustrade of wood round the top, and is surmounted by a revolving dome twenty-three feet in diameter, which rests on a circular wall, built to a hight of seven feet above the highest part of the roof.

EUROPEAN AND AMERICAN INSTRUMENT MAKERS.

The meridian transit instrument is in the west wing. It was made by Messrs. Ertel & Son, at Munich, with an object glass 5·3 inches aperture, and focal length of about 86 inches. The lens was refigured and repolished by Messrs. Alvan Clark & Sons in the autumn of 1862, with decided improvement both in achromatism and definition. Stars wholly invisible during daylight prior to the change can now be observed with great satisfaction; but, except on very rare occasions, its power, under ordinary illuminations, does not extend beyond stars of the 10th magnitude.

The mural circle is in the east wing, and is mounted upon the east face of a sandstone pier. It is five feet in diameter, and connected with the central portion by twelve radii that are strengthened on their backs by edge bars and united midway by a second concentric circle.

Its telescope is a cylinder secured to the circle both at the center and near the extremities. The object glass has a diameter of 4·0 inches and (as made by Troughton & Simms) a focal length of five feet. As the form of the object glass was not entirely satisfactory, and its focal length rendered the use of a high magnifying power exceedingly inconvenient, it was placed in the hands of Messrs. Alvan Clark & Sons during the month of November, 1862. The modifications effected by them were an increase of focal length to 5 feet 4 inches, and improvements both in achromatism and defining power.

A transit meridian circle is in the same room and east of the mural circle. It was originally made by Messrs. Ertel & Son, at Munich, and subsequently remodelled and furnished with new circles by Mr. William J. Young, of Philadelphia.

The object glass (of the equatorial instrument) being slightly under-corrected for color, and its performance not equaling others of like dimensions, in 1862 it was placed in the hands of Messrs. Clark & Sons to refigure. They increased the focal length about an inch, corrected the defective achromatism, and certainly improved the definition; but the flint disk is not a perfect one, and no amount of labor would ever make it an object glass of the first class.

Experience during two years having shown that American workmen could make, with one exception, all nautical instruments needed by the navy, and that these instruments in materials, execution, and cost, most creditably compared with specimens from the best reputed foreign establishments, it has become a permanent policy to purchase only from domestic manufacturers. As they were compelled to incur considerable outlay in preparing special tools and machinery for the new character of work, they thereby established a right to consideration. But, in addition to this claim to regard, they persevered to success under difficulties with materials and manipulation, and have greatly improved many of the patterns given them to work from. The preparation of colored glass for sextants, the forms of needles for liquid and other compasses, and the best method of insulating them, and the packing of marine barometer tubes to secure them against breakage by concussions from discharges of heavy ordnance, are among the subjects of experiments of the year.

ACCURACY OF BAROMETERS.

The barometer is a Newman standard No. 75. It is mounted against the back of the clock pier. Its tube has a diameter of 0·582 inches, and the reading of the mercury column by Vernier is to 0·002 inches. As the oxidizing mercury of its cistern has greatly affected the upper part of the tube, early in 1862 the instrument was taken down and cleaned by Mr. James Green. After being remounted, simultaneous comparisons were made with the standard in the Superintendent's room, the observers being interchanged to eliminate personal peculiarities of reading. A mean of ten comparisons, corrected for capillarity and temperature, shows that Newman No. 75 requires a further correction—0·0001 inches.

THE divisibility of copper is so great that a grain of it, dissolved in an alkali, will give a sensible color to 500,000 times its weight in water.

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Correspondence

Verd-Antique in the United States.

Messrs. Editors:—On page 369, of No. 24, Vol. XIII., Scientific American, under the head of "Latest Foreign Intelligence," you draw attention to the advantages of serpentine, introduced during the past few years in the buildings of London and other large cities.

Now it may interest some of your readers to know that the serpentine alluded to is what is generally known among marble masons as verd-antique marble, and that we have in America an article as good as any in the world, and that it could be delivered in New York, and our other large cities, at as cheap a rate, for building purposes, as the Vermont and other white and colored marbles, and yet we are using an imported article no better, and some of it not as good, for interior decorations, but on a very limited scale, owing to its high price.

We boast of our marble palaces in our large cities, and still we have not a building in the United States of verd-antique marble—nothing as good and certainly not as handsome.

Dana, in the "Manual of Mineralogy," page 147, says:—"Serpentine forms a handsome marble when polished, especially when mixed with limestone, constituting verd-antique marble. Its colors are often beautifully clouded, and it is much sought for as a material for tables, jambs for fire places and ornamental work. The quarries of Milford and New Haven, Conn., afford a beautiful verd-antique, and have been wrought; but the works are now suspended." On page 364:—"It occurs at Milford and New Haven, Conn., of fine quality, and also at Port Henry, Essex Co., on Lake Champlain. A marble of this kind occurs at Genoa and in Tuscany, and is much valued for its beauty. A variety is called *polzivera di Genoa*, and *vert de Egypt*."

Prof. Emmonds, Geologist of the Second District of the State of New York, so long ago as 1837, reported to His Excellency, W. L. Marcy, Governor of the State of New York, under the head "verd-antique," that he had discovered several localities of "this beautiful marble. The colors are green and white, arranged in the usual forms of clouded marble. The serpentine has a bright green color, and belongs to the variety usually called precious. The calcareous spar is white, or grayish white, and forms a handsome ground for the translucent serpentine. The quality of the rock is excellent. So sound is it that a mass rings like a piece of clinkstone. This variety of marble has always been esteemed in works of art, and if I mistake not, bears in market a higher price that any other. It might be introduced into the parlors of the rich for ornamental tables, to the exclusion of foreign articles. To effect this it is only requisite that it should be known, that the public may have an opportunity of judging of its qualities. Polished specimens may be seen in the collection, in the Museum at Albany."

On page 226 of the report before-mentioned, under the head "Geology of the County of Essex," he states:—"Besides the iron and limestone, I discovered a valuable bed of verd-antique marble, near Cedar Point, Port Henry. Its beauty is equal to any of the marbles of this description."

There is a quarry of verd-antique marble at Roxbury, Vt., of which Dr. Jackson, of Boston, says:—"It very closely resembles the European verd-antique, but where the latter has carbonate of lime, the former has carbonate of magnesia, and that this has a superior out-of-door durability, and longer resists decomposition from the atmosphere, from fire, and from acids. It offers no hold to moss."

Prof. Emmonds, in his admirable work, "American Geology," page 84, says of serpentine:—"In Middlefield and Chester, it forms a range of hills some five or six miles in length, and less than half-a-mile in breadth. The serpentine of the bare hills, near Baltimore, resembles that of Chester, and is probably more extensive."

Now, would any one believe, in the face of such evidence as this, that there is not at present a serpentine quarry being worked in the United States, and that what we do use of it is imported. Yet such is the case. I believe the principal reason is, as stated by Mr. Booth in the work before quoted from, that there is still some prejudice in favor of an imported material on the part of the uninformed, to which dealers must cater. It is time we discontinued importing what we can obtain at home at our very doors.

I believe if men of means, acquainted with the marble business, would take hold of this, we could be supplied with a building material, for beauty and durability, equal to any in the world, and far superior to anything at present in use for that purpose. The Port Henry verd-antique could be purchased at a nominal sum; it lies on a plank road, within five hundred yards of a good dock, on the shore of Lake Champlain, where it could be put on board boats and freighted to New York, without transhipment, at $3 per tun, and so to all parts of the United States and the Canadas.

But in Port Henry everybody appears to be getting rich out of magnetic iron ore. Within a radius of three miles are the mines of the Lake Champlain Iron Ore Co., Witherbees, Sherman & Co., proprietors; the Champlain Mining Co., the Port Henry Iron Ore Co., the Cheever Ore Bed Co., the Fisher Ore Bed Co., the Essex and Lake Champlain Iron Ore Co., the Essex and Lake Champlain Ore and Iron Co., and the Barton Hill Ore Bed Co. Thirty years ago, when Prof. Emmonds first drew attention to the iron ore of Essex County, in the report before-mentioned, there were not over five hundred tuns a year shipped. Last year there were two hundred thousand tuns shipped to all parts of the country, even so far away as to Pittsburgh, Pa. Witherbees, Sherman & Co., alone, shipped over one hundred and fourteen thousand tuns.

To give you an idea of the value of these magnetic ores, I send you a cabinet specimen, taken from a vein known in the market as New Bed; it belongs to the latter company, and is said to contain more pure iron than the same weight of pig metal.

The verd-antique marble is now used for foundations for the engines, for underpinning barns, and for building stone fences.

Thirty years hence there will probably be as many tuns of this serpentine marble shipped as there are now of iron ore, and as much money realized from it; for, as Prof. Emmonds said, thirty years ago:—"To effect this it is only necessary that it should be known that the public may have an opportunity to judge of its qualities."

My only object in writing you this letter is to assist you in making it known, as I believe it to be of national importance to use home manufactures.

T. G. Massie.

Gunpowder---Lard Oil.

Messrs. Editors:—If you think proper, please reply to the following questions in your "Notes and Queries":—

First, What is the estimated temperature of the gases resulting from the combustion of gunpowder just before the explosion, or when they are in their most compressed state?

Second, Suppose a cubic inch of lard oil, for instance, be converted by heat into permanent gases, and these gases, then compressed into a space of 25 cubic inches, would these gases, in expanding, perform work equal to one twenty-fifth of the amount of heat (if mechanically applied) consumed in converting the lard-oil into gas?

Hackettstown, N. J., Dec. 8, 1865.

[The temperature of the gases resulting from the combustion of gunpowder, at the instant of explosion, has been variously estimated—some good authorities computing it at 2,192°. It varies very greatly with the conditions under which the powder is burned, especially with the degree of confinement. Bunsen ascertained that when gunpowder is burned in the open air, the combustion is very imperfect, the quantity of heat generated being consequently less than is produced by perfect combustion. Even in the case of perfect combustion, though the quantity of heat would be in all cases the same, its intensity would be in inverse proportion to the space in which it was inclosed.

Lard oil is decomposed at a temperature of about 600°, the oxygen and hydrogen being driven off in the form of gas, and the carbon remaining behind; but to volatilize the carbon requires the heat of a powerful galvanic battery; it is even doubted by some whether carbon can be volatilized by any heat known. If, however, the carbon be brought in contact with oxygen at a red heat, the two combine chemically, forming either carbonic oxide or carbonic acid, and both of these compounds take the gaseous form at ordinary temperatures. Our correspondent will see from the complex character of the problem, the impossibility of making the computation desired.—Eds.

The Pitch of Gears.

Messrs. Editors:—The best thing I ever saw to get the size of the pitch line of wheels, is Mr. Sereno Newton's tables, now out of print. He gives the proportional radii for 5,640 wheels, for a pitch of one-fourth of an inch to three inches, from 10 teeth to 400, the true radii to set the tramel, and go to work. I have used these tables over thirty years without finding an error in them. I wish, for the good of mechanics, that some enterprising publisher would reissue them.

Your correspondent, on page 293, gives a good rule for those that understand algebra and surveying; but what do mechanics, generally, know about these things? Another one, on page 340 says, "That the pitch of gears is the distance between the centers of the teeth measured on the pitch line, not on a straight line between two adjacent teeth." I respectfully differ from him. I measure between two cogs, the same as between two dots, I always measure in a straight line. Mr. Newton, above referred to, says:—"The pitch of a wheel is the distance of the centers of two contiguous teeth, measured on their pitch line." I differ from the correspondent on one more point. He says that a wheel of 100 teeth is twice the diameter of a wheel that has 50 teeth. He assumes that calculating the circumference of a wheel is the way to find the pitch line. I think this erroneous in both science and practice. All that is necessary to come to the truth is to call the wheels polygons of 100 and 50 sides, and calculate their circumferences as such. Mr. Newton's tables are made on this principle. I copy from his table the proportional radii for two wheels of 10 and 20 teeth, of three inches pitch; pinion 4·854; wheel, 9·589. Now let us double the size of the pinion—4·854 × 2 = 9·708; subtract and see the difference—9·589 from 9·708 leaves ·119 difference; radii ·238 in diameter, and ·748 in circumference, which is nearly three-fourths of an inch.

Jared W. Smith.

New Haven, Conn., Dec. 12, 1865.

Screw Cutting.

Mr. J. A. Whitmore, an attentive correspondent, sends us the following method of cutting threads in lathes:—

"Having noticed a number of communications in your valuable paper concerning screw cutting, and not having seen anything like the system I use, I thought some of your readers would like it better than their own. The rule is this:—Multiply the number of your screw and the number of threads you wish to cut by any number that will give a number or numbers of which you have gears to correspond. Thus, if you wish to cut a 12 thread and your lathe has a 3 thread, this multiplied by 8 gives 96 and 24, or an 11 thread. With a 6 screw, multiplied by 5, gives 55 and 30, or by 6, gives 66 and 36. It matters not what your multiplier is if it will give you one or two numbers which will correspond with gears which you have on hand; or if you can get one gear, will only have to make one of the less number.

It is equally as good for fractional threads, which every repair shop has to do with more or less. Take 3½ thread with a 5 screw; then 7 × 3½ = 26, 7 × 5 = 35. Where the thread is finer than the screw, place your small gear on the spindle; but where it is coarser than the screw, the large gear goes on the spindle. This rule applies only where the spindle and stud are geared even."

Report of Lieut.-General Grant.—Messrs. Appleton & Co., No. 443 Broadway, New York, have just issued a pamphlet edition of the masterly report of our great military chief. The report is accompanied by a portrait of the General, and embraces 77 pages, in bold clear type. Price 50 cents.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Apparatus for Boring Wells.—The object of this invention is to improve some of the devices and appliances used in connection with a derrick for boring oil and other deep wells, and it consists in applying a brake to the windlass on which the drill rope is wound, so as to control the descent of the drill when it is to be lowered in preparation for work; also in placing a pulley in front of the windlass of the sand-pump rope, so that the rope shall be wound thereon square, although the windlass may not be directly in front of the derrick; also in a mode of making the frame which sustains the windlass of the sand-pump rope. P. H. Hynes, of Cooperstown, New York, is the inventor.

Combined Envelope and Letter Sheet.—This invention relates to a new and improved combination of an envelope and letter sheet; which, it is believed, possesses advantages over the various plans hitherto devised for effecting the same end. The invention consists in applying flaps to the letter sheet in such a manner that when the sheet is folded with a single fold, the flaps may be turned over the folded sheet and gummed, so as to securely conceal the face side of the letter sheet and render it impossible to see its contents and the invention at the same time admitting of the flaps being widely torn open without at all injuring the letter sheet, and the letter sheet, when folded and the flaps gummed over it, having the appearance of an ordinary detached envelope with a letter sheet within it. Chas. Rowland, Clinton, Ill., is the inventor.

Improved Lamp Wick.—This invention relates to a new and improved lamp wick, and has for its object, the constructing of the wick in such a manner that it may be adjusted, raised and lowered in the wick tube by means of a serrated wheel, and always be under the perfect control of said wheel. There has hitherto been a great difficulty in adjusting lamp wicks in their tubes by means of serrated wheels; the wick, if supplying the flame properly by capillary attraction, being too loose to be operated upon perfectly by a serrated wheel, the latter being inclined to catch and stick in the loose texture; and, if the wick be made sufficiently hard or compact to obviate this difficulty, another one presents itself in the form of a lack of capillary attraction, and the flame consequently is poorly supplied with the burning fluid or oil. This invention, it is believed, fully obviates these difficulties, and to this end it consists in inclosing a series of loose fiber longitudinally within a case knit or woven so as to form a close or compact covering for the loose fiber, and without interfering in the least with the capillary attractive power of said fiber, from a firm or compact exterior from the serrated wheel to act upon. Person Noyce, Lowell, Mass., is the inventor.

Starter Brake for Railroad Cars.—This invention relates to a new and useful device to be applied to railroad cars and other wheeled vehicles to serve as a brake and also to assist the vehicle in starting, the parts being arranged in such a manner that the impetus or momemtum of the vehicle, when the device is applied as a brake to stop the vehicle, will be husbanded or stored up and made to apply itself to the vehicle as a moter in starting the same. The invention is more especially designed for street or horse-railroad cars, and to relieve the horses in starting them. Street cars are generally constructed to carry a large number of passengers, and a team can draw a great number when the car is fairly under way. The great difficulty occurs in starting, and as cars of this class are necessarily stopped at very short intervals, in order to take in and let out passengers, any means which can relieve the team or assist it in starting the car will not only effect a saving as regards the labor of the team, but will also greatly expedite the progress of the car on its route. Thos. R. Sinclair, New York City, is the inventor.

Tanning Apparatus.—This invention relates to an apparatus which is intended particularly to reduce the labor required for handling the hides or skins during the process of tanning. This purpose i effected by the use of baskets provided with a large number of hooks or crossbars on which the hides or skins can be hung, said baskets extending down into the pits, and being suspended from truck frames which rest on suitable rail tracks, in combination with a crank shaft, connecting by suitable rods with said baskets, in such a manner that by turning the crank shaft a reciprocating motion is imparted to the baskets, and the desired agitation of the hides in the tanning liquor is effected. The operation of laying away the leather for the purpose of increasing its weight is also facilitated by the use of baskets which are provided with tilting bottoms, and which are fitted with alternate layers of tan and leather, and immersed into the pits partially filled with tanning liquor in such a manner that the entire mass of leather can be raised from the pit and lowered therein in a short time; and when it is desired to take the leather out, the operation can be effected with ease and facility simply by raising the baskets and allowing their bottoms to swing open. Henry Leibermann, Paducah, Ky., is the inventor.

OPINIONS OF THE PRESS.

The Erie, Pa., *Dispatch*, says:—"We have received the prospectus of this able paper for 1866. On the 1st of January next it will commence a new volume. To those of our readers who are engaged in scientific or mechanical pursuits we shall be doing a favor in pointing to some of its excellencies. Having been ourself, for fifteen years, a practical mechanical engineer and machinist, we believe we have a right to express a decided opinion on the merits of this unequaled mechanical journal. Its publishers are too modest when they term it the 'best paper in the United States, for mechanics, inventors and manufacturers.' It is the best either in this country or Europe. A mechanic might almost be without the tools of his trade, or his tables of mensuration and of the comparative qualities of substances as without the SCIENTIFIC AMERICAN. Unlike popular journals generally, this never publishes mechanical or scientific trash, or gives notoriety and countenance to mechanical humbugs. We never knew one of its recipes or directions for doing work to fail. Its illustrations are not surpassed, if equaled, by those of any other publication, and its explanations are always lucid and plain. Its value to the inventor, in presenting weekly a full list of patents, with specifications, can hardly be estimated. To the progressive mechanic, the intelligent farmer and the scientific student, its editorials, recipes, reports and comments on mechanical progress are invaluable. Although not now in the strictly mechanical line, we regard it as among the most valuable of our exchanges. Every mechanic should take it."

The Rochester *Evening Express*, says:—

This meritorious publication enters upon a new volume on the first of January prox., and issues its prospectus for the year 1866. It has been in the field for upward of twenty years, and so well has its conductors met the public want for a magazine of its kind that no similar publication has been able to compete with it. Several such have been commenced since the AMERICAN attained its great popularity, but found the ground so well occupied that they failed to receive sufficient patronage for support, and were compelled to back out. The SCIENTIFIC AMERICAN is acknowlegded on all sides to be the best paper in the country for mechanics, inventors, and manufacturers."

The Providence *Evening Press* says:—

"This paper has been published twenty years, and during that time has been the organ of the practical, mechanical and inventive talent of the country. It has been conducted with masterly ability and is a complete record of the principal inventions and discoveries of the day. Its articles are profusely illustrated, and all the principal tools and machinery used in workshops, manufactories, steam and mechanical engravings, woolen, cotton, chemical, petroleum, and other manufacturing and producing interests are fully described. Its several departments embrace popular and practical science in its application to the varied interests of the country. Household, horticultural, and farm impliments are especially noticed, that a knowledge of all improvements in these directions may be as widely diffused as possible.

The Boston *Advocate* says:—

The prospectus of the magnificent weekly, known as the SCIENTIFIC AMERICAN, published at New York, by Munn & Co., is before us. What we have often said before, we reiterate now, that no mechanic, artisan, inventor, or manufacturer, should fail to subscribe for a paper which chimes so admirably with all these pursuits of life. Elegantly printed, illustrated with all the perfectness of art and genius, and so wholly devoted to mechanical improvement, it seems as that it properly makes a demand for universal circulation.

HAZELNUTS, and the bark of the boughs on which they grow, are found in perfect preservation and large quantities at great depths in the peat beds of Ireland. The nuts never contain a trace of the kernel, and the wood has generally decayed, leaving the bark as a tube.

THE tenacity of cast copper is sufficient to support a weight of 19,000 lbs. to the square inch, or rather more than half as much as good cast iron.

Notes and Queries

A., of Pa., says:—"A patents the mode of making an article, also gets another patent on the production. B contends that the patent will not hold good on the production unless A confines himself to the first patent. A wants to know what is the use of a second patent, or patent on the production, as A considers himself secure by having the patent on the production, no matter how it is produced afterward." ANS.—Separate patents, both valid, may exist, one for the machine and one for the production. A new and useful article can be patented without limitation as to the manner of its production. It is always best, in important manufactures, to obtain as many securities as the patent laws will allow.

A. P., of Canada, asks:—"Why cannot you, who are so great a nation, be magnanimous, and extend to us the rights of other foreigners in regard to patents, even if we are narrow-minded in this thing?" ANS.—Our correspondent should remember that the United States laws permit Canadians to take out patents on payment of $500 But by the laws of Canada, Americans are wholly prohibited from obtaining patents there. The Canadian Parliament has for many successive years refused to change their law so as to conform to similar laws of other enlightened nations.

J. B. W., of Va.—A portable engine is any engine that can be moved from place to place. The best engines are advertised in the SCIENTIFIC AMERICAN. You can use the exhaust steam for any purpose, if it is properly applied.

D. R. P., of Ky.—We have seen no satisfactory proof of the great economy claimed for the engine spoken of.

H. R. W., of N. J.—The substance you send us is French gelatin, prepared from colorless isinglass, and afterward tinted to suit the taste. It is said to be made of fish bones.

H. V. J.—A good quality of iron, resembling Russia iron, is made in Boston.

J. P. B., of Ill.—Chilled tools are cast from hard metal in an iron mold, cutting end down.

C. M. M., of Mass.—T. H. Leavitt, No. 49 Congress street, Boston, Mass., has published a work on peat, and has the machinery.

L. D., of Cal.—It is well known that sound travels faster in moist than in dry weather.

E. N. G., Pa.—We do not know where mezzo-tint tools could be had. Why do you not inquire of Sartain, in your city?

Constant Reader, of N. Y—Cows' milk may be retarded from souring by the addition of a small quantity of carbonate of soda, say a piece as big as a large pea to a quart. A better way is to drink it while fresh.

S. W. B., of Ill.—If a thing is patented the date of the patent must be stamped thereupon. If not patented, it is an offense so to stamp.

J. B., of Pa.—We are always ready to publish any suggestions in relation to ornamental design, provided they have any force or interest.

J. H. R., of Ill.—The construction of a boiler 12 feet in diameter, of Bessemer steel, that would sustain 5,000 lbs. to the inch, is probably within the power of mechanical art, but such a boiler would be enormously expensive—too expensive to be practical.

J. H. P., of Mich.—The porcelain lining of cast-iron pots is baked on at a high temperature; it could not be applied to wood.

The Crank Motion.

Watt devised no fewer than five distinct methods of obtaining rotary motion without using the crank, by means of wheels of various sorts rotating round an axis. The motion eventually preferred was that invented by Murdock, and known as the sun-and-planet motion, which has the singular property of going twice round for each stroke of the engine. Watt has spoken of the sun-and-planet motion as an old plan of his own, revived and executed by William Murdock, but the late Mr. Josiah Parkes has stated that at an interview he had with Mr. Watt, at which Murdock was present, the latter spoke of the sun-and-planet motion as his invention, which Watt did not contradict. Boulton has also attributed the invention to Murdock, in an authenticated letter written about the time the motion was being patented. One of the original Boulton and Watt engines, fitted with the sun-and-planet motion, still exists at the brewery of Messrs. Combe and Delafield. The engine is used occasionally when the more modern machine is stopped, and does good work.—*Mechanics' Magazine.*

FROM the experiments made by Prof. Thomson, of Copenhagen, on light as a source of motion, he calculates that the light emitted by the sun would lift thirty-five billions of tuns one billion of kilometers high per second, and that it would raise the earth twenty feet at the same time.

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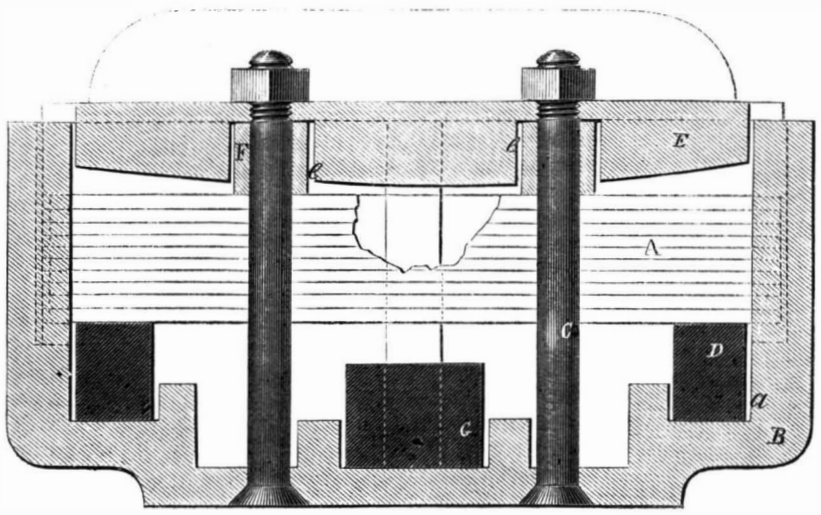
Improved Car Spring.

The object of the inventor in designing this spring was to obtain a device which should have a gradually increasing resistance up to a certain point, so that, instead of setting immediately under a heavy load, or being stiff and unyielding under a light one, it should adapt itself to all circumstances possible within the range of its capacity. In this he has succeeded, if practical tests be any criterion, for large numbers of them are daily running on the Philadelphia and Erie, New Jersey Central, and Delaware and Lackawanna Railroads. The spring is constructed as follows:—

Any desired number of steel plates, A, are placed in parallel rows in a casting, B, in two tiers, side by side, so that bolts, C, can go *between*, not through them. These plates rest at the ends on india-rubber blocks, D. There is a cap, E, over all which is also provided with rubber blocks, as at F. When a slight load is in the car the rubber in the cap takes the weight. As these blocks project only one-quarter of an inch, it takes but little to bring them down. The cap then rests on the plates at the center, and the pressure is resisted by the end blocks, D. A still further addition to the load brings the plates down on the central rubber block, G, where they are supported at the breaking point.

The steel is not taxed in the least with a light load—all shocks being received by the rubber; and the influence of vibration which is claimed to be very destructive to the endurance of that metal, much lessened by being received on a yielding cushion.

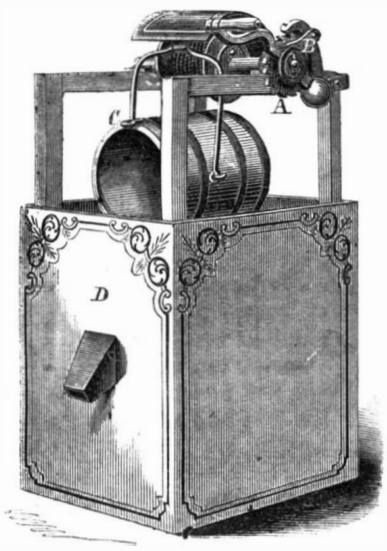
A patent on this invention was granted to Geo. Douglass, of Scranton, Pa., on Nov. 7, 1865, through the Scientific American Patent Agency. For further information address him at that place.



DOUGLASS'S CAR SPRING.

PERRINE'S WATER-ELEVATOR.

"The old oaken bucket that hung in the well," was, doubtless, a convenient affair for the period, but



before one could get fresh water with it, the great sweep had to be pulled down, and as much time consumed in lowering the bucket as in raising it. Not only that, but it was double the labor for the hand, and was, taken altogether, a rude affair.

The windlass is a much better mechanical device than the well pole, but ordinary ones are open to the same objection noted above.

Of late they have been much improved. Instead of lowering the bucket by hand, a simple movement disconnects the windlass from the handle so that the bucket goes down like a shot, plump into the bottom of the well. A man can draw twice as much water, with much less labor, by a windlass of this kind as with the old-fashioned affair.

If only one pail of water had to be raised, this would be a small consideration, but, where there are cattle to water, farmers will appreciate it, or, when washing-day occurs, housekeepers will find it a great convenience. The arrangement is shown very clearly in the engraving published herewith. The windlass the rope runs on is the same as any, but at the end there is a ratchet wheel, A, and a pawl, B. When the bucket is to be raised full, the pawl catches in the teeth of the ratchet and holds, so that the windlass winds up the rope. When the bucket comes to the top there is a projection, C, on the rim, which takes hold of an iron rod inside the curb, D, and tips up the pail, as shown in the engraving. The water then falls into a trough inside the curb, and is discharged at the spout. Now, to lower the bucket, it is only necessary to turn the handle the opposite way from raising it. The pawl, B, is then lifted clear of the ratchet wheel, and down goes the bucket as swift as thought—a valve in the bottom of it allowing the water to rush in and fill it again. The velocity with which the bucket descends is controlled by pressing with the handle against the hub of the ratchet wheel, friction being thus created which acts as a brake and retards the descent, so that it may be lowered as easily as any other, or as fast as required. Many serious accidents have happened from a too rapid descent of the old-fashioned windlass which are entirely prevented in this; moreover, the bucket can be held or rested at any point. When strongly made, so as to be durable, these water elevators are a great convenience. We use one of them—though not of this kind—at our house in the country, and would not dispense with it.

Patented on Sept. 12, 1865, by Peter Perrine, of Little Falls, N. Y. For further information address him at that place. State and County rights for sale.

"Negative Slip" of Kerosene Lamp Wicks.

When the burners for kerosene lamps come from the factory, there is no difficulty in raising or depressing the wick, by the spur wheels, which presses against the flat cotton wick. After some use, however, these wheels do not grip the wick, and it will no longer freely rise or fall. The low price at which these burners must be furnished, interferes with the manufacture of proper tubes and elevators, which will not need repair for years. Many of our readers have doubtless been troubled by the slipping of the wick, and a correspondent informs us of twelve disabled lamps in his village, waiting their turn to be repaired, at an expense of fifty cents each. Having suffered much inconvenience from the cause mentioned, he tried several experiments, with only partial success; the last one, however, is so simple, and inexpensive, and so entirely satisfactory, that many of our subscribers will thank us for publishing the remedy which is as follows:—

"Take a strip of copper wire-glaze, the width of the wick, or a trifle less, and two or three inches long; the wire-cloth may be from 50 to 70 threads to the inch; insert this between the wick, and the pointed wheels, and the points will no longer slip, but force the wire cloth up, while the roughness of the cloth will draw the wick along with it. The top of the wire cloth and the wick will be even, as they protrude from the burner; but as the former is not wanted in the flame, hold the wick firm between your finger, and turn the wire-cloth down with the other hand about half an inch, and all will be in working order."

HALL'S SPINNING ROLLERS.

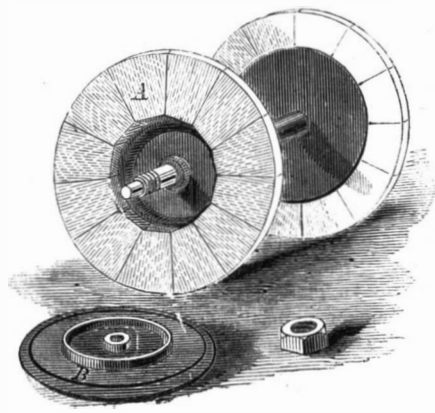
The present style of spinning rollers used in the manufacture of flax, hemp, manilla, jute, and other fibers, are a constant source of expense and trouble, being made of wood, in solid blocks, driven on to a mandrel or shaft, with the grain of the wood parallel with the shaft, and there turned. The objections to this method are, that suitable wood is difficult to obtain, and that it is liable to split in preparing; they are in constant need of repair and renewal, as they last but a short time owing to the great pressure required and the twisting of the fiber causing the grain of the wood to break, and the rollers to become uneven and eccentric in their operation.

By the improvement shown in the engraving below, the wood used is cut from ordinary lumber into small tapering pieces, without waste; these pieces are placed between plates of cast iron and screwed fast on the mandrel, so as to present the end of the grain of wood to the fiber being spun or twisted. This method makes the face of the rollers even and uniform, and much more durable than the old method, and, consequently, better and cheaper. The new style is easily dressed, and when the wood is entirely worn out, new pieces can be substituted without any trouble by any ordinary workman.

The inventor says:—"These rollers have been thoroughly tried in the same frames with the old style; they were run three months without requiring the least repair, and, from appearances, would last three years, while those of the old style were entirely worn out in less than a month."

This improvement is applicable not only for spinning but for all preparing machinery.

A patent on this invention was granted to Henry Hall, of Lambertville, N. J., on October, 1865, and application made for patents in England. For rights



to use the rollers, or further information, address Thomas Hall, No. 505 Broadway, New York.

A MAN in Atlanta, Ga, having a dirty well that he wished cleaned, intimated to a colored man, under a bond of secrecy, that a valuable treasure was hidden there by an Express Company, and that he and a companion would share the proceeds if it could be recovered. In about an hour a hundred negroes knew the "secret," and set to work with a will as fast as they could, and soon cleaned the well out, but were quite disgusted when they got through and found no prize. One after another, smelling something rotten, departed his own way no wiser or better off than when he began.

A NUMBER of ancient coins have been discovered in the course of the excavations adjoining the Bristol Cathedral, England. One of the officials has in his possession several Roman copper coins of a very ancient date, one of them being A.D. 117. Nearly all of them are in very excellent preservation, considering their age, and exhibit well the beauty of the coinage of such a remote time.

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THE "LORD CLYDE"—ENGLISH IRON-CLADS.

The English Government has lately completed another iron-clad vessel of large dimensions both in hull and engine.

The vessel is of the class adopted by the English, being high out of water, and presenting a fair mark in hull and spars for artillery practice.

The hull is 280 feet long, 59 feet beam and 21 feet deep, and is 4,067 tuns burthen and finely modeled. The engines are the largest afloat; they are of the double piston-rod pattern, back-acting, with cylinders 116 inches in diameter and 4 feet stroke. The cylinders weigh nearly 30 tuns, and have slide valves working *vertically* (?) on the outside, by link motion; also gridiron expansion valve worked directly from the main shaft by eccentrics. The boilers are 9 in number and have brass tubes 2½ inches in diameter, with an aggregate heating surface of 19,000 square feet, and 700 feet of grate surface. The chimneys are 7 ft. 6 in. in diameter. There are surface condensers on Hall's plan; that is to say, the tubes are packed, top and bottom, with glands and stuffing-boxes, to allow them to expand without leaking. Two centrifugal pumps supply the water for circulation; these are worked by independent or donkey engines. Steam is used superheated in the main engines. Auxiliary engines are also supplied to work the main engines at starting or in maneuvering. The screw is four-bladed, 23 feet in diameter, and 22 feet 6 inches pitch.

At the trial of these massive engines on the measured mile, with steam at——pounds, and vacuum at 28 inches, the speed obtained was 13½ knots per hour. The speed of the screw was 12·825 knots per hour, showing a negative slip of three-fourths of a knot. The draft of water was 22 feet forward, and 24 feet aft—a condition highly unfavorable to speed. It is not stated by our cotemporary, the London *Engineer*, from which we derive these particulars, what pressure of steam is carried, or the grade of expansion.

The *Lord Clyde* is the fastest vessel in the English navy.

THE DIFFERENCE BETWEEN DISTILLED AND FERMENTED LIQUORS.

In all ardent spirits the alcohol is formed from sugar by fermentation; in distilled liquors a portion of the water has been separated by distillation; the difference, therefore, is, that distilled liquors contain more alcohol in proportion to the water than merely fermented liquors.

Brandy is obtained by the fermentation of the sugar of various fruits—fructose; rum by the fermentation of cane sugar; and whisky by the fermentation of glucose, the sugar which is produced from the starch of various grains and roots. In all these cases a fermented liquor is first produced, and then a portion of the water is separated by distillation.

The process of distillation depends on the difference in the volatility of alcohol and water. Alcohol boils at 173° and water at 212°; by subjecting a mixture of the two, therefore, to a temperature of 173°, the alcohol is boiled away, and the water is left behind. The vessel is closed by an air-tight cover, from which a long pipe, bent in spiral form, is wound through a tub of cold water, and thus the vapor of alcohol is condensed to the liquid state again, when it can be caught and barreled. Alcohol has, however, so strong affinity for water, that it carries over considerable, and the separation by distillation is far from perfect; the strongest liquors obtained in this way do not contain more than 54 per cent of alcohol. A further portion of the water is separated by passing the liquor through quicklime, or other substance for which water has a stronger affinity than it has for alcohol.

Brandy and whisky both make their first appearance in fermented liquors—brandy in wine, cider, or perry; and whisky in ale or beer. The difference in the flavor of these liquors is due to the presence, in very minute quantities, of certain essential oils and ethers. From the extremely small quantities of these oils, it might be supposed that there could be no difference between brandy and whisky in their action on the system; but this is not a safe inference. As the action is upon the nerves, it is impossible to say how small a quantity may produce the most important effects.

FIVE HUNDRED DOLLARS REWARD FOR A VARNISH.

In our advertising columns will be found an offer, by the Aerial Navigation Company, of a reward of $500 for a baloon varnish that will fill certain conditions, one of these conditions being, that it shall prevent endosmosis and exosmosis. As these terms may not be familiar to all our readers, let us briefly explain them.

If a piece of bladder is tied over the lower end of a long glass tube, and the tube, partly filled with alcohol, has its lower end inserted in a vessel of water, the water will pass inward through the bladder more rapidly than the alcohol will pass outward, and the liquid in the tube will consequently rise upward until it overflows at the top. Dutrochet, who first examined this phenomenon, called the flowing inward of the liquid endosmosis, from the Greek *endon* inward, and *osmos* impulse. At the same time a small portion of alcohol passes outward, and this movement he called exosmosis. At the present time the flow in both directions is designated by the general term osmose.

The explanation of the experiment described is, that the bladder absorbs water more readily than it does alcohol; as the water reaches the upper surface of the bladder it mixes with the alcohol, in accordance with the general law of liquid diffusion, giving place for the absorption of a further supply of water. On the other hand, the flow of alcohol in the opposite direction is in proportion to its affinity for the substance of the bladder.

In almost every case in which osmotic action occurs, a chemical change is wrought in the material of the bladder or other membrane employed; and if a partition of gypsum, clay, compressed charcoal, or other porous substance that is not acted on by the liquids, is substituted for the organic membrane, no osmotic action takes place.

When balloons are filled with hydrogen gas, or with carbureted hydrogen, and surrounded by the mixture of oxygen and nitrogen that constitutes our atmosphere, the gas within the balloon passes outward through the oiled silk or other material of the balloon, and the atmospheric air passes inward. This transference is called by some osmose, but we suppose the term not to be applicable in this case. If the interposing membrane exerts no absorbent action on the gases, but if they merely pass mechanically through its pores, the action would not be called osmotic.

What the advertisers want, however, is a material that will retain the light gas within the baloon, and will exclude the atmospheric air.

PROFESSOR CHANDLER ON BOILER INCRUSTATIONS.

We noticed last week a report on boiler incrustations made to the President and Directors of the New York Central Railroad, by Charles F. Chandler, Ph. D., Professor of Analytical and Applied Chemistry in the School of Mines, Columbia College, New York, and, in accordance with our announcement, we now proceed to lay the principal portion of this report before our readers.

PLAN OF THE INVESTIGATIONS.

"The following investigations were undertaken with the object of diminishing, as far as possible, the bad effects of the impure water supplied to locomotives on the section of the New York Central Railroad between Syracuse and Rochester. The large quantities of sulphate of lime and of the carbonates of lime and magnesia which these waters contain give rise to incrustations, varying from a loose mud to a hard crystalline scale. These deposits form a non-conducting lining to the boiler, involving loss of heat and consequent waste of fuel, and at the same time cause an over-heating of the metal, sometimes resulting in destructive explosions. The quantity of incrustation produced varies greatly. As much as thirteen hundred pounds have been taken from a boiler at one time, though this is an extreme case. The most serious injury from these waters is suffered, however, by the lower plates of the boilers, which are rapidly corroded in deep furrows and pits, and are sometimes even completely perforated, particularly along joints and about braces.

"In planning these investigations it was considered desirable—first, to subject the waters to careful analyses; second, to analyze the incrustations; third, to examine the various articles and methods in use for preventing incrustations and corrosion; fifth, to institute a series of experiments on the boilers themselves."

COMPOSITION OF WATERS NOW SUPPLIED TO LOCOMOTIVES.

Stations.	CORRODING CONSTITUENTS. Ch. of Potassium	Ch. Sodium	Ch. of Magnesium	Sul. Potassa	Sul. Soda	Sum.	INCRUSTING CONSTITUENTS. Sul. of Lime	Car. M'gnesia	Car. of Lime	Oxide of Iron	Silica	Sum.	INCRUSTAT'N PREVENTIVES. Car. Potassa	Car. of Soda	Org. Matter	Total.
Syracuse, Onondaga Creek	0·32	2·14	...	...	0·98	3·44	10·68	4·31	7·25	0·06	0·28	22·58	....	....	0·34	26·36
Syracuse, Hydrant	0·24	...	...	...	0·07	0·38	16·71	3·69	6·84	0·06	0·25	27·55	....	....	trace	27·93
Warner's	1·91	...	...	...	...	3·72	...	3·63	7·17	0·11	1·37	11·28	2·17	6·09	0·37	23·63
Memphis	0·29	0·26	...	...	0·36	0·91	10·12	4·41	6·75	0·09	0·31	21·68	....	....	0·18	22·77
Jordan	0·33	0·76	...	...	0·62	1·71	4·02	2·30	5·03	0·03	0·09	11·47	....	....	0·06	13·24
Port Byron	0·39	...	...	0·32	0·37	1·08	0·01	1·57	5·43	trace	0·16	7·17	....	....	1·28	9·53
Savannah	0·59	...	...	0·07	0·69	1·35	...	5·94	11·93	0·10	0·56	17·63	....	....	1·52	20·50
Clyde: Spring	0·14	...	...	0·18	0·45	0·77	...	4·40	9·66	trace	0·58	14·64	....	....	2·16	17·58
Clyde River	0·52	...	...	...	1·21	2·10	4·40	3·03	6·07	trace	0·80	14·30	....	....	1·88	18·28
Lyons	0·29	0·37	...	0·03	0·71	1·03	3·17	3·34	4·38	trace	0·18	11·07	....	....	1·00	13·10
Newark	0·47	0·38	...	...	0·32	1·17	3·19	6·01	9·15	0·08	0·30	18·73	....	....	2·16	22·07
Palmyra	0·76	...	...	...	0·67	1·43	18·81	5·98	8·41	0·02	0·17	33·39	....	....	1·46	37·28
Macedon Swamp	0·14	...	...	...	0·39	0·71	0·14	1·03	7·68	trace	0·04	10·53	....	....	1·14	12·04
Fairport	0·34	0·69	2·16	...	0·18	3·19	8·72	1·03	5·07	0·10	0·20	15·06	....	....	1·14	19·39
Rochester, North street well	0·96	4·82	1·53	...	...	7·31	16·92	8·88	16·92	0·10	0·90	33·26	....	....	1·69	42·17
Rochester, Genesee River	0·28	0·05	...	...	...	1·18	3·16	4·64	2·06	0·09	0·90	10·85	....	....	1·64	13·67
Rochester, Canal, Round House	0·33	0·17	...	...	0·61	1·11	2·16	4·60	1·81	0·05	0·18	8·80	....	....	1·24	11·15
Average	0·49	0·57	0·22	0·1 6	0·49	1·93	5·39	7·47	3·75	0·05	0·39	17·05	0·13	0·36	1·10	20·57

The numbers represent grains per gallon of 231 cubic inches.

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ANALYSES OF WATERS.

The separate account of the several analyses we omit, as the results are presented in condensed form in the table on the preceding page.

It appears from the foregoing table that the average composition of water is:—

			Grains.
Corroding constituents			1·93
Sulphate of Lime	5·39 grs.	Incrusting constituents.	17·05
Carbonate of Lime			
Carbonate of Magnesia.	11·66 "		
Oxide of Iron and Silica			
Organic matter			1·10
Incrustation preventives			0·49
Total per gallon			20·57

ANALYSES OF THE INCRUSTATIONS.

It was considered desirable to analyze a sufficient number of incrustations to determine with certainty their prevailing character. Although the analyses of the waters gave a tolerably good idea of the composition of the deposits, and made it certain that the chief constituents must be carbonate of lime, carbonate of magnesia, and sulphate of lime, a knowledge of the average proportions of these different constituents was essential to the proper selection of remedies, as the carbonates and sulphates require different reagents for their solution. Ten incrustations were therefore selected; six of them as fair average representatives of the usual deposits, and four as exceptional varieties.

The results of the analyses are tabulated as follows:—

ANALYSES OF BOILER INCRUSTATIONS.

	Source.	Structure.	Thickness.	Sulphate of Lime.	Carbonate of Lime.	Basic Carbonate of Magnesia.	Oxide of Iron and Aluminum	Water.	Organic Matter.	Silica.	Total.	
1.	Stationary engine, boiler shop. Syracuse: Hydrant water	Compact and crystaline.	3-16ths in.	74·07	14·78	9·19	0·08	1·14	undet.	0·65	99·91	
2.	Stationary engine, machine shop. Rochester: Canal water, 10 mos. Well water, 2 mos.	"	2 inches.	71·37	....	....	26·87	....	....	1·76	100·00	
3.	Locomotive, No. 211. Freight, both roads. Syracuse	"	1-32d inch. 1-4th to 1-3d inch.	62·86 53·05	12 62	18·95	0·92 42·16	.... 1·28	undet.	2·60 4·79	99·23 100·00	
4.	Locomotive: surrounding a brace	"										
5.	Locomotive, No. 127. Freight, both roads. Syracuse	"	1-32d inch.	46·83	....	....	47·85	....	....	5·32	100·00	
6.	Locomotive, No. 202. Freight, both roads. Syracuse	"	1-4th inch.	30·80	26·93	31·17	1·08	2·44	undet.	7·75	100·17	
	Average			56·49	18·11	19·77	0·69	1·62	undet.	3·81		Fair average representatives of the usual incrustations.
7.	Stationary engine, Niagara Falls: River water	Friable and granular.	2 inches.	4·95	86·25	2·71	1·03	0·63	undet.	2·07	97·54	
8.	Stationary engine, Townsend's Furnace, Albany	"	1¼ inches.	0·88	93·10	2·84	0·36	0 15	1·96	0·62	100·00	
9.	Locomotive, No. 122. Rochester to Buffalo	"	.....	4·81	....	....	....	....	....	2·92	100·00	
10.	Stationary engine. Bushydt and Greenleigh, Schenectady	Powder.	"	30·07	....	....	61·09	....	....	8·24	100·00	Exceptional incrustations, the only ones of their kind.

The incrustations appear to be of three kinds:—

1. Hard, compact, and crystalline, formed of numerous thin layers, and consisting of from 30 to 75 per cent of sulphate of lime, associated with carbonate of lime, basic carbonate of magnesia ($2MgO, CO_2$) etc.

The average composition of the six specimens analyzed was—

Sulphate of lime	56·49
Carbonate of lime	18·11
Basic carbonate of magnesia	19,77
Oxide of iron and alumina	0·69
Silica	3·81
Organic matter	undet.
Water	1·62
	100·00

With a single exception all the locomotive incrustations were of this character, as were also most of those from stationary boilers. The incrustations from marine boilers belong to this class, consisting almost entirely of sulphate of lime.

2. Loose and friable, not at all crystalline; in thick masses, not in well-defined layers, composed chiefly of carbonate of lime. Only two specimens of this variety were met with, both from stationary boilers. They are evidently deposited from water containing very little sulphate of lime.

3. Consisting of a fine powder or mud. Noticed in only two instances; in one case in a locomotive, in the other in a stationary boiler. In composition the two specimens differ; one consisting chiefly of carbonate of lime and magnesia, the other containing 30 per cent of sulphate of lime.

[To be continued.]

PATENT-OFFICE DECISIONS.

INTERFERRENCE BETWEEN THE SEWING MACHINES OF A AND B.

Elisha Foote for the Board:—A's machine is designed to make either the shuttle stitch or the Grover & Baker stich at pleasure. His improvement consists mostly in devices by which the change is conveniently made from one to the other.

The first claim that is adjudged to interfere is as follows:—

"So constructing a sewing machine that it may be made to sew with two threads forming a shuttle or lock stich, or a double-loop stich at the pleasure of the operator, without taking from it any of its parts or adding to it other parts, substantially as described."

It is to be observed that A was not the first to make a machine with these changeable qualities. Several have been patented not only in this country but in England and France. In the machine of Nivelle, a Frenchman, patented here in 1861, it is necessary only to take out the looper and put in the shuttle, or take out the shuttle and put in the looper to make either of these stitches.

In view of these previous devices it is evident that A has invented nothing more than a particular form or mode of doing that which others before him had done in other ways, and he cannot claim anything beyond the scope of his invention, or any device that is not substantially his. He cannot by claiming properties and functions extend his patent so as to embrace other modes not his own.

The claim above stated is intended to secure the property of making a machine changeable "without taking from it any of its parts, or adding to it other parts." So that any other device though entirely different from his, in its whole structure and operation, if it happen to possess such a property, will infringe.

The property itself thus claimed, is not important. Its infringement would depend upon whether a shuttle was left out or put in its place—whether a needle was drawn back out of the way, or removed, and such like circumstances of little or no practical consequence, even Nivelle by simply turning his under needle to one side, instead of taking it out, would become an infringer. The case has no resemblance to those in which some new process has been discovered, or new principle applied, or new and important results attained by means which are but secondary and which can be varied without affecting the substance of the invention.

Two recent decisions by the Supreme Court of the United States apply to this case, and are opposed to such a claim. We refer to Burr *vs.* Duryee (1 Wallace, 553), and Case *vs.* Brown (2 *ib.* 320(, and in accordance with them the claim must be held to be in admissible and should be disallowed.

The machine of B is designed to make several different kinds of stitches. The object that he seems to have in view was to make a machine that by a few changes and adjustments would make most of the known and some new machine stitches. It is manifest that his application for a patent has been prematurely made, and that some of his devices have not received the test of a working machine.

There is scarcely a thing in common in the devices of the two parties. But B as well as A claims properties and functions, and the interference between them has arisen from these abstract claims.

The remarks we have made in regard to A's first claim apply equally to several of B's and to some more of A's. These should all be disallowed and then there will be left no interference between the parties. Each may be entitled to his specific devices, but neither to the general functions that have created the interference.

The conclusion has rendered it necessary for us to examine the testimony in reference to the priority of invention. The decision of the examiner is reversed.

IRON improved with titanium has been tested for tensile strength, and has stood a strain equal to 47 tuns per square inch; and, in puddling furnaces fettled with the ore, the fettling has in some instances lasted a month without renewal, the iron produced being of uniform good quality. These are extreme cases, but indicate the value of the use of the ore.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING DECEMBER 19, 1865.

Reported Officially for the Scientific American.

☞ **Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

51,533.—Stop Valve.—Edward Andrews, Pottsville, Pa.:

First, I claim the combination of the plug, A, chamber, C, and valve, B, for the purposes and in the manner set forth.

Second, The combination of the plug, A, chamber, C, valve, B, and gage cock, D, substantially as described.

51,534.—Foot Warmer.—Josias J. Andrews, Clyde, Ill.:

First, I claim the combination and arrangement of the exterior casing, A, the plates, R and T, the partitions, F and I, and the apertures, D b and e, substantially as and for the purposes shown and set forth.

Second, In combination with the above I claim the employment of the oil cup, B, and wick-tube, C, arranged and operating as and for the purposes specified.

Third, I claim the combination of the casing, A, the plates, R and T, the partitions, F I, apertures, D, lamp, B C, perforated plate, E, and cone, G, all arranged and operating in the manner and for the purpose herein specified and shown.

51,535.—Car Coupling.—Theophilus Arndt, Mountjoy, Pa.:

I claim the link, or shackle, C, provided with hooks, b, at its ends, in combination with the sliding rod, D, and the spring, H, arranged within the draw head, substantially as and for the purpose set forth.

I further claim the elastic or yielding plates, a a, in the draw head when used in combination with the sliding rod, D, and spring, H, substantially as and for the purpose set forth.

[This invention relates to a car coupling of that class termed self-acting, and it consists in the use of a hook link or shackle, in connection with a sliding bolt and a draw head divided with yielding sides, whereby the link or shackle of the draw head of one car is readily allowed to connect itself with the draw head of an adjoining car, and the link or shackle readily disconnected when necessary.]

51,536.—Gang Plow.—Caroll Atwood, Lebanon, Ill.:

I claim the metal bars, H and I I, in connection with the clamp, J, all arranged substantially as shown, to admit of the lateral adjustment of the plow beams with the sills, F F, for the purpose set forth.

51,537.—Quartz Crusher.—A. C. Austin, San Francisco, Cal.:

I claim the manner of causing the jaws, K, to approach each other by being drawn down inclined planes for the purposes described and in the manner substantially as set forth.

51,538.—Bolt Screwing Machine.—Avery Babbett, Auburn, N. Y.:

I claim, First, The sliding ring, D, for holding the dies, when used as, and for the purpose set forth.

Second, The inclined planes above described, when used in the manner and for the purpose herein specified.

51,539.—Dough Roller.—D. B. Baker, Rollersville, Ohio:

I claim the device for rolling bread and other doughs, herein described, the same consisting of a traveling plattorm in combination with a roller or rollers, hung in adjustable bearings above the same, arranged and operating together substantially in the manner described.

I also claim the traveling platform, supported at each end upon rollers, g, and operated by a pinion and rack gear, in combination with the roller, o, hung in adjustable bearings of the standards, a a, arranged together substantially as and for the purpose specified.

51,540.—Corn Horse for Stacking Corn.—Loring S. Barker, Pittsford, Mich.:

I claim a folding corn horse, with a saddle or its equivalent (in place of the long pin, a, Fig. 6), and with movable legs for the purpose herein described.

51,541.—Treadle Motion for Sewing Machines.—Herrick M. Barnes, Easthampton, Mass.:

I claim the combination of the wheel, D, arms, A B, rods, h k, and a treadle or other motive power, when arranged and operating in the manner and for the purpose herein set forth.

51,542.—Knife Polisher.—Joseph W. Battelle, Worcester, Mass.:

I claim an improved knife polisher, in which all the parts are constructed, arranged and combined in relation to each other, as shown and described.

51,543.—Gang Plow.—J. F. and W. L. Black, Lancaster, Ill.:

First, We claim the connecting of one of the wheels, C', to its axle, A, by means of the bar, E, fitted in a socket, D, and connected by a chain, G, to a lever, H, in the manner substantially as described, to admit of the vertical adjustment of the plows, for the purpose specified.

Second, The adjusting of the draught pole, M, laterally through the medium of the screw, g, plate, h, and nut, i, substantially as and for the purpose set forth.

[This is seemingly a simple and excellent implement for plowing with a gang of plows.]

51,544.—Device for Controlling the Spool-thread in Sewing Machines.—H. E. Bodwell, Jr., Milburn, N. J.:

I claim the combination of the threaded sleeve, C, having a shoulder, c', nut, D, and perforated plates, B B', when constructed and employed as and for the purposes specified.

[The object of this invention is to prevent the thread of spools set on sewing machines from springing over the ends of the spools, and so becoming entangled and soiled, and it consists in providing supplementary flanges on the ends of spools, or in making their flanges of an increased diameter, so that their peripheries shall extend beyond the circumference of the body of thread, whereby, when the thread is unwound, its coil shall not be allowed to spring over the ends of the spool.]

51,545.—Carpet Stretcher.—John Boyd, Lowell, Mass.:

I claim the combination of the pieces, H B, with the hinged side, D D, and the set screws, b b, arranged and operating substantially as described and represented.

[This invention consists in so constructing the handle of a carpet stretcher that it can easily be extended in length to suit different persons, and when not in use can be closed and folded up, making a

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mall and convenient article, the head of the device being provided with a serrated plate, so arranged that the depth of its teeth can be quickly adjusted, as desired.]

51,546.—Harvester.—Frank Bramer, Fabius, N. Y.:

I claim the drum, C, provided with the vertical flange, b, and the internal gearing in combination with the planet wheels, c c', mounted on the arm, E, sleeve, e', provided with the pinion, e, bevel wheels, F and G, and clutch, H, all arranged and operating as herein shown and described.

Second, I claim the rest, n, constructed as shown, and secured to the end of the axle, for the purpose of holding the cutter bar securely when folded back, as shown in red in fig. 2.

Third, I claim the slotted plate, l, attached to the brace bar, J, in combination with the push bar, L, having its front end pivoted at m, as shown and described.

I claim adjusting the drum, e, by means of plates or wedges inserted between the vertical flanges, a, at the rear and between the horizontal flanges, b, at the front, either or both, as may be desired.

51,547.—Guide and Tuck-marker for Sewing Machines. Franklin H. Brown, Chicago, Ill.:

First, I claim roller, A, in combination with the vertical guide, C', and horizontal pieces, C C, when the roller is placed horizontally with and at an angle across and into, said guide, as and for the purpose set forth.

Second. I claim the combination of the horizontal pieces, C C, and the vertical guide, c, as and for the purposes specified.

Third, I claim the sheath, d, pencil holder, h, wire, e, and projection f, in combination with a sewing machine guide, substantially as set forth.

51,548.—Flour Bolt.—John Brown, of Utica, N. Y.:

I claim the combination and arrangement of the bolt constructed and operating as described, and the air apparatus also constructed and operating as described, for the uses and purposes mentioned.

51,549.—Grinding Mill for Grain.—John Brown, Utica, N. Y.:

First, I claim the apertures, B B1 B2 B3, in combination with the means of adjusting the stones, substantially as described.

Second, I claim the dress of the stones, consisting of the master furrows, G1 G2 G3 G4, and the lands, H H, in combination with the dress of F, substantially as described.

51,550.—Rake Attachment to Harvesters.—Robert D. Brown, Covington, Ind.:

First, I claim giving the rake a continuous horizontal and self-adjusting erect motion by the endless chain, G, guide rod, R, and check levers, S, when arranged and combined with the platform, as herein described, for the purposes set forth.

51,551.—Grinding Mill.—T. B. Burtis, Chicago, Ill.:

First, I claim the placing or arranging of the shell, B, in the framing, A, in the manner substantially as shown, to admit of the self-lateral adjustment of said shell relatively with the grinder, C, for the purpose specified.

Second, I claim the providing of the lower part of the grinder, C, both internally and externally with fans or wings, E, substantially as and for the purpose set forth.

51,552.—Spittoon for Dental Chairs.—W. M. Butler, San Francisco, Cal.:

First, I claim, in combination with the spittoon, B, the amalgamating bath or cup, L, or its equivalent, for the purpose herein specified and set forth

Second, I claim attaching the spittoon to the chair by means of the universal joint, E F, as set forth.

51,553,—Dental Chair.—Wm. M. Butler, San Francisco, Cal.:

I claim the arrangement of the segments, G and M, and their lever stops, in combination with the chair seat and pedestal, in the manner and for the purposes set forth.

51,554.—Lathe for Wood Turning.—Wilson W. Carey, Lowell, Mass.:

I claim the former, F, with the irregular piece of wood, I, in combination with the fixed guide, J, and revolving guides, K, and cutters, E, as herein described.

51,555.—Horse Hay Fork.—T. Case, Dexter, Mich.:

I claim the combination of the horizontal toggle bar, E, and tripping rope, F, with the bar, A, ties, a b, and hoisting rope, D, when arranged to operate as and for the purpose herein specified.

51,556.—Calendar Clock.—W. K. Chase, Charlestown, Mass.:

I claim, First, The anchor pallet, f, in combination with the lever, h, or its equivalent, arranged substantially as and for the purpose specified.

Second, The arrangement of the calendar rolls, herein described, connected with and operated by the actuating wheel of the clock through the bar, d', arranged with regard thereto, and so as to operate substantially in the manner specified.

[This invention relates to a peculiar arrangement of the pallet in connection with the 'scape wheel of a clock, which allows it to be easily and readily thrown out of and into the rotating plane of the wheel, thus leaving it free to rotate, whereby the hands of the clock can be set to indicate the right time with but little delay and without directly touching the hands of the clock. And also to the combination with a clock of a calendar connected with the operating parts of the clock in such a manner that, upon the expiration of every twenty-four hours, it is operated thereby in the proper direction to show and indicate the day of the week and month.]

51,557.—Refining Petroleum by Filtration.—Robert A. Chesebrough, New York City:

I claim the use of peat charcoal, either by itself or in combination with other substances for purifying or refining petroleum by filtration.

51,558.—Refining Petroleum by Filtration.—Robert A. Chesebrough, New York City:

I claim the use of alumina and substances containing alumina, either by itself or in combination with other substances, for purifying petroleum by filtration.

51,559.—Stringing Pianos.—Antoine Choplain and P. E. Chollet, of New York City:

We claim the apparatus for stringing pianofortes by which they can be tuned by persons unacquainted with music or even by deaf and dumb persons, as above described.

51,560.—Combined Machine for Planting, Hoeing and Digging Potatoes.—John C. Clement, Kenduskeag, Maine:

I claim the frame, A B', hopper, B, feed board, A', coulter, C, shares, D, roller, E, and blades, F, when the several parts are so arranged and combined as to form at will a potato planter, cultivator, or digger, as herein specified.

51,561.—Belt Fastening.—Michel W. Costolo, Boston, Mass.:

I claim the bars A A, curved at their ends and having holes drilled through them, in combination with the rods, b' b', all arranged and applied substantially as and for the purpose herein set forth.

[This invention relates to a new fastening for connecting together the ends of belts for driving machinery. Its object is to obtain a simple and efficient device which may be readily applied to a belt and admit of the same being readily taken up or tightened whenever required.]

51,562.—Wool Drier.—John E. Crane, Lowell, Mass.:

I claim to dry wool or other fibrous substance by atmospheric air, drawn through the wool, by means of the draught of a high chimney, substantially as specified.

51,563.—Expanding Tool.—John Critchley, Portsmouth, N. H.:

I claim the expanding tool herein described, consisting of the stock, A, provided with the radial grooves, a, the nuts, c, and keys or cutters, b all constructed and arranged in the manner and for the purpose specified.

[This invention relates to a tool which can be used as a mandrel or for reaming, tapping, boring, and other work. It consists of a cylindrical stock with three or more tapering grooves cut in its surface parallel to its axis, in combination with keys fitting into them and with nuts applied to the end of the stock, and bearing on the ends of the keys or cutters, in such a manner that, by unscrewing one of the nuts and screwing up the other, the keys or cutters are caused to slide in the tapering grooves, and, consequently, to expand or contract radially, and an expanding, mandrel, reamer, tap, or other tool is obtained of great practical convenience.]

51,564.—Level.—Gustavus Cuppers, New York City:

First, I claim the combined gravitation level and inclino-meter, when constructed, arranged, and operating substantially as herein described.

Second, I claim the combination with a pendulum hand of a level index and the circular opening in the top of the casing.

Third, The method herein described of suspending the index hand.

51,565.—Steam Engine.—T. A. de Blois, Annapolis, Md.:

I claim the slide, G, fitted on the slotted head, F, of the cylinder, A, in combination with the connecting rod, C, attached directly to the piston, B, substantially as and for the purpose set forth.

[This invention relates to an improvement in such engines in which the connecting rod is attached directly to the piston, and which are generally known by the term trunk engines. Such engines are usually single acting, one end of the cylinder being left open to permit the connection rod to perform its motion and the object of this invention is to construct a double-acting trunk engine, which is effected by passing the connecting rod through a slide fitted in suitable keys over the open end of the cylinder, in such a manner that, by said slide, the cylinder is closed, and, at the same time, the connecting rod is free to follow the motion of the crank.]

51,566.—Beehive.—Lewis Defenbaugh, Kokomo, Ind.:

First, I claim a reversible beehive, which consists of four apartments, c c d d, communicating with each other, and provided with sliding classes for shutting off the communications, substantially as described.

Second, Sustaining the beehive, which is constructed substantially as described, upon pivot bearings, in such manner that it can be turned over at pleasure, without disturbing the bees.

Third, The combination of the chambers, c c d d, with the two covers, B B', and a hive box which moves about a central axis, substantially as described.

Fourth, Providing the chambers, c s, with removable cases, G, substantially as described.

51,567.—Cultivator.—Daniel Dennett, Buxton, Me.:

I claim the plow standards, constructed as herein described, in combination with the beam fastened by the cross piece to the front standards, and with the braces or ties that confine the rear standards to the front standards, substantially as herein specified.

51,568.—Suspended.

51,569.—Suspended.

51,570—Suspended.

51,571.—Suspended.

51,572.—Suspended.

51,573.—Meat Safe.—Eli Duncan, West Milton, Ohio:

I claim a meat or provision safe, constructed and arranged as and for the purposes herein specified.

[This invention consists principally in the use of a supplementary safe, attached to or forming a part of the principal or main meat-safe, in which additional safe, the meat being used from time to time, can be kept thus, avoiding the necessity of often opening the large or main safe, the advantages of which are manifest.]

51,574.—Fire-lighting Attachment for Stoves.—J. W. Elliot, Leicester, Mass.:

I claim the chamber, G, to be placed in such relation to an opening in the side of the stove, immediately above the grate bars, as to expose the fuel contained therein to the flames of the kindling wood, substantially as described.

51,575.—Corn Planter.—Dan J. Ely, Acton, Ind.:

I claim the casts, J J, in the wheels, B and B2, with their cavities, K K, and flanges, d d, the slides, C' and D', with their rollers, E' E', the levers, T U S R, and their connecting rods, P and Q, the ratchet on the wheel, B2, and the partition, f, and measure, g, for extending the space for the corn to drop, all arranged and operating substantially as and for the purpose described.

51,576.—Padlock.—V. Enders, New York City:

I claim the double-armed spring catch, h f, applied in combination with the bolt, C, shackle, B, latch, D, tumblers, E, and key, K, or its equivalent, all constructed and operating substantially as and for the purpose set forth.

[This invention relates to a lock of that class in which a series of tumblers are applied, in combination with a revolving bolt, which when the shackle is depressed, catches in the recess or slot thereof and prevents it from being raised or opened. The tumblers are arranged in the proper position to allow of opening the lock by the action of a key, which may be arranged with a rectilinear or with an oscillating motion, and which also acts on the bolt to impart to the same the requisite revolving motion for unlocking. In order to prevent the bolt from turning back spontaneously before the shackle is turned down, a spring dog is applied which catches into a recess of the bolt, and which is disengaged from said recess by the action of the shackle.]

51,577.—Knitting-machine Needle.—Levi W. Fifield, New Hampton, N. H.:

I claim the combination and arrangement of the notches, e and l, with the closer, B, its cam and the grooved and hooked shank, A.

I also claim the combination and arrangement of one or more slots, g, and pins, h, with the hook, a, and the recess, d, of the needle, A, and its closer, B, each slot and its pin in such an arrangement, serving not only to hold the slide in connection with the needle shank, but to stop the slide in its forward or forward and backward movements as set forth.

51,578.—Cigar Machine.—Earls J. Fisk, South Byron, N. Y.:

I claim the combination and arrangement of the gate, D, and slide, F, the former provided with the holes, q q, and the latter with the wires, G G, and pins, o o, and employed in connection with the ledge, m, substantially as and for the purpose herein set forth.

I also claim the combination of the section al spring follower, H H, rock-frame, I, board, M, and leaf, N, arranged and operating substantially as and for the purpose herein set forth.

I also claim the rollers, P P, having an enlargement or swell, d, in the center, and made to extend by means of the couplings, b', the whole arranged, combined and operating substantially as herein set forth.

I also claim connecting the cranks, g' g' g' g', with a single head or handle, R, when the same are used in combination with the rollers, P P, substantially as set forth

In combination with the cones, S S, I also claim the bearings, K' K', and set screws, l' l', substantially as and for the purpose herein set forth.

I also claim the flexible disks, p' p', in combination with rollers, P P, or equivalent, and the cones, S S, substantially as described.

51,579.—Harvester.—Jacob L. Garver, Hamilton, Ohio:

I claim, First, The arrangement of the slotted and doubly-grooved journal box, H h h' h'', tongued washer, K K, bolt, G, and yoke, C, or their equivalents, for the positive, exact and stable adjustment of the driver or master wheel, with each change of pinions, substantially as set forth.

Second, The lever, I I', formed and adapted to operate in combination with the adjustable yoke, C, and with the perforated rack, F, on the main frame, in the manner represented.

Third, In a harvester whose driver, or master wheel, journals in an adjustable yoke, C, I claim the vertical bearer standard, N n n', so arranged upon the yoke as to place the unshipping lever, M m, within convenient reach of the person driving, while the machine is in motion, as set forth.

51,580.—Washing and Wringing Machine.—Robert A Gawler, Concord, N. H.:

I claim the reciprocating board, E, in combination with the pressure boards, C C, and endless belts, I P, arranged for joint operation, substantially as and for the purpose specified.

I also claim the wringers, B, B', when used in combination with the endless belts, I P, reciprocating board, E, and pressure boards, C C, substantially as and for the purpose set forth.

[This invention relates to a new and improved clothes-washing machine, of that class in which the clothes are subjected to a requisite degree of pressure and friction, by means of corrugated boards. The invention consists in the employment or use of a vertical reciprocating fluted or corrugated board, operating between the pressure boards, in connection with two endless feed or converging belts, arranged with the reciprocating board and the pressure board in such a manner that the clothes will be fed between the pressure boards and around the reciprocating board so as to be acted upon in the most efficient manner. Wringers are also used in connection with the endless belts by which the clothes may have the moisture expressed from them as they are washed.]

51,581.—Strap Adjuster.—Harry E. Gennig, Philadelphia, Pa.:

I claim the arrangement of the strap, A, the handle, B, the buckle, C, and the punch or gimlet, s, substantially as herein specified and described.

51,582.—Neck-rope Halter.—Kendall Gibbs, Berwick, Me.:

I claim the neck-rope halter with the loop and adjustable concave button, substantially as herein described.

51,583.—Folding Shelf.—G. W. Gillespie, Hartford, Conn.:

I claim the combination of the shelf, A, bracket, B, and knees, c, all constructed and arranged to operate substantially as and for the purpose set forth.

[This invention consists in providing a shelf with hinged brackets capable of being folded down upon the shelf, and in providing these brackets and shelves with metallic knees or plates whereby the same can be quickly and readily secured to the wall.]

51,584.—Manufacture of Opaque Pigments.—Stuart Gwynn, New York City. Antedated Dec. 5, 1865:

I claim the methods of making opaque pigments, producing in the normal pigments a structural change, thereby altering their mechanical qualities, and freeing them from gaseous and other impurities, by means substantially the same as I have described, and which constitutes them a new article of manufacture.

51,585.—Wagon Shoe Locks.—Alexander Hamilton, Washington, D. C.:

I claim the combination of the rods and levers described, by which the circular and rectilinear motion is given to the shoe bar, for the purpose of bringing the shoe to the required position.

I also claim the rod, H, lug, k, and the perforated plate, J, arranged and operated substantially as described.

51,586.—Quartz Crusher.—W. W. Hanscom, San Francisco, Cal.:

I claim the arrangement of the friction rollers, H, and the adjustable plate, I, substantially as and for the purpose specified.

[This invention relates to a new and improved machine for crushing and pulverizing ores, rocks, etc., and it consists in the employment or use of a stationary jaw and a movable one, both jaws having curved faces, and the movable one operated in a novel way, whereby the ore or rock may be crushed in a much more efficient manner than hitherto, and with a less expenditure of power.]

51,587.—Machine for Cutting Cork.—Peter Hayden, Pittsburgh, Pa.:

I claim the described arrangement by which the strip placed on the slide, G, is advanced to the knife for the severance of the blank, the latter being clamped in position for the second operation of shaping, substantially as described and represented.

[This invention relates to a new and improved machine for cutting corks and bungs of cylindrical or conical form, and it consists in the employment or use of a circular cutter or saw, in connection with a slide and a rotating clamp, attached to an adjustable bed.]

51,588.—Piano-forte Action.—Martin Hester, New York City:

I claim the application of the metallic springs, a, in piano-forte actions, for the purpose substantially described and set forth.

51,589.—Machine for Husking Corn.—J. M. Hubbard, West Haven, Conn.:

I claim the cutter, D, attached to blocks, E, in combination with the bars, F, fitted on the rod, H, the arms, h, of blocks, E, and the fixed bar, I, in the box, A, all arranged substantially as and for the purpose set forth.

I further claim, in combination with the parts above specified, the conical rollers, L, and wheel, K, all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved machine for stripping the husks from indian corn, and cutting the ears from the stalks. The invention consists in the employment or use of a series of knives arranged with rollers in such a manner as to cut the ears from the stalks and separate the latter from the former. The invention consists further in using a wheel and one or more rollers, arranged in such a manner as to strip the husks from the ears.]

51,590.—Washing Machine.—Michael Huiet, Miamisburg, Ohio:

I claim the tub, A A' B B' C, having at its mid length the vertical slotted partition, D D' d, in the described combination with the oscillating two-winged slotted beater E F f G g H H', constructed and operating substantially as set forth.

51,591.—Washing Machine.—Michael Huiet, Miamisburg, Ohio:

I claim the arrangement of tub, B, having the form of a truncated cylindrical sector, and being ribbed longitudinally on its floor and sides, E E', the ribbed lids, F F', and the open-barred beater, D, carrying in its upper part a pair of wringing rollers, G G'.

51,592.—Boring Wells.—P. J. Hynes, Cooperstown, Pa.:

I claim connecting the cap, G, of the frame of the sand-pump windlass to the rigid standard, P, by a pivot, and to the loose standard, H, by a fixed joint, substantially as set forth.

51,593.—Artificial Leg.—George B. Jewett, Salem, Mass.:

I claim, in artificial legs designed for the treatment of the kind of cases hereinbefore mentioned, the above-explained arrangement of the knee joints with respect to the knee rest, G, such joints under such arrangement being brought above the bearing of the natural knee on the rest, and so as to be in or about in the prolongation of the the axis of motion of the knee.

I also claim the improved knee joint, constructed substantially as described, viz: with the joint pin screwed into the external parts of the joint, and with one of such parts connected to the other by screws or their equivalents.

I also claim the combination of the knee rest, stirrup or supporter, D, and its thigh belt, sustaining branches, b b, with the tibia post branches, c c, arranged as specified.

I also claim the combination of the knee rest, G, its supporter, D, the thigh belt branches, b b, and the tibia post branches, c c, arranged as specified.

I also claim the combination of the thigh belt or flexible lacing socket, H, the knee rest, G, the supporter, D, and the branches, b b and c c, hinged together, and connected with the tibia post, the whole being substantially as hereinbefore explained.

I also claim the arrangement of the retractile strap with, or its application directly to, the knee rest as described.

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51,594.—Curtain Fixture.—Edward M. Judd, New Haven, Conn.:

I claim the stop lever, K, notched to take the squared axle of the curtain collar, and operated by the cord, g, as and for the purposes specified.

51,595.—Washing Machine.—D. Kellogg, Jackson, Mich.:

I claim the inclined bed of rollers, B, placed within a suds box, A, provided with an inclined bottom, a, in connection with the rubber, C, provided with rollers, b', and having elastic rings, c, fitted on them, substantially as and for the purpose herein set forth.

I also claim the combination of the rollers, b' b', corrugated end pieces, e e, transverse bar, D, and grooves, d, as and for the purposes described.

[This invention consists in the employment or use of an inclined bed of rollers, in connection with a reciprocating rubber composed of a frame provided with rotating shafts, having upon them a series of elastic rings, all being so constructed and arranged that clothes may be washed in a perfect manner and without injury.]

51,596.—Grinding Mill.—John Kemp, Brooklyn, N. Y.:

I claim the described method of introducing air between the surfaces of the stones, consisting of an upper supply, derived through the eye of the runner, and a lower supply, derived from a chamber under the bed stone, through air ducts in the latter, which open into the grooves of the same, as described and represented.

[This invention consists in passing to and between the grinding surfaces of the ordinary millstones used for the grinding of wheat, etc., one or more currents of cool air, or any other suitable cooling medium, for the purpose of preventing the heating of the stones to a great degree, by their friction, and thus enable a much better result or product from the mill to be obtained than possible by the ordinary wheat mills, as well as also preventing the deterioration of the grinding mills.]

51,597.—Rotating Whiffletree.—Charles C. Lee, Washington, D. C.:

I claim the right and left strap sockets, B B, they having a curved finger or prong, b, a hooked under lip, c, and straight upper lip, a, with their reversed inclined edges, as described, in combination with a thimble socket, E, pintle, F, spring, e, supporting brace, f, all constructed, arranged, and operating in the manner substantially as and for the purposes herein set forth.

51,598.—Rock Drill.—John M. Linscott, New York City:

I claim, First, The cutters H H' and the sliders I I' constructed and operating substantially as and for the purpose specified.

Second, The diagonal slot, E E, in the manner and for the purpose substantially as described.

Third, The combination of the thimble bolt, D, and the wedge, C, constructed and operating as and for the purpose described.

Fourth, The manner of inclircling or surrounding the steel spindle A, wedge, G, with iron, substantially in the manner set forth.

51,599.—Grain Binder.—Sylvanus D. Locke, Janesville, Wis. Antedated June 19, 1865:

I claim, First, The combinaion of a yielding or elastic compressing arm, with a curvilinear grain guard, substantially as and for the purpose set forth.

Second, The combination of a cam producing an intermittent motion with a reciprocating, yielding, or elastic compressing arm, and a curvilinear grain guard, substantially as, and for the purpose set forth

51,600.—Grain Binder.—Sylvanus D. Lock, Janesville, Wis.:

I claim a rotating slotted hook constructed with or without a spring-closing device, substantially as set forth.

51,601.—Sawing Machine.—James R. Logan, Bellmore, Ind.:

I claim the block, N, provided with the spring, i, and pivoted bearing, j, to operate in connection with the saw arm, H, substantially as and for the purpose set forth.

The arrangement of the hinged or jointed frame, C, provided with the crank shaft, D, the pitman, E, the pivoted or vibrating bar, F, the arm, H, having the saw, I, attached and the adjustable bars, J J, applied to the jointed frame, C, substantially as and for the purpose herein set forth.

51,602.—Pump for Deep Wells.—Thomas J. Lovegrove, Philadelphia, Pa.:

First, I claim, placing an inclosed shield within the cistern, substantially as and for the purpose set forth.

Second, The vertical valves in the cistern, when arranged, substantially as described, to operate in the manner set forth.

Third, Puncturing the valved shield, substantially in the manner described for the purpose set forth.

Fourth, the combination of the shield constructed, substantially as described, with the cistern when both are closed at the bottom and with the piston, and vertical valves, all arranged and operating substantially as set forth.

51,603.—Elevator Bucket.—John Magee, Chicago, Ill.:

First, I claim providing the front edge of the bucket, A, with the wrought rebated metallic band, B, constructed as shown and arranged and operating substantially as herein described.

Second, I claim the arrangement of one or more braces, D, provided with the shoulders, d, with the bucket A, constructed with the rebated bar, B, as and for the purposes shown and described.

51,604.—Hinge.—W. C. McGill, Cincinnati, Ohio:

First, I claim one spring or more connecting and holding together two pieces of metal so as to form a hinge, substantially as herein described.

Second, Parts A and B in combination with one spring or more, arranged so as to hold the hinge either open or closed, as specified and set forth.

51,605.—Can for Tea, Sugar, Etc.—David H. Meloy, Waterbury, Conn.:

I claim, The combination of the horizontal grooves, c, inclined grooves c' cover, B, and pins, b b, all constructed and arranged to operate as and for the purpose specified.

[This invention relates to an improvement in that class of cans which are used by grocers and others, for the purpose of holding tea, coffees, cracker and other articles.]

51,606.—Machinery for Making Buckles.—Lampson P. Mitchell, Waterbury, Conn.:

I claim the combination of the shute, s, trough, t, and feeding slide, w, with the dies, x y, and mechanism for bending the wire to shape, substantially as set forth.

51,607.—Ventilating Window for Railroad Cars.—Robert Monroe, E. Stone and Edgar St. John, Elmira, N. Y.

I claim the arrangement of the following named parts, viz: hinges, e, operating rod, f, jointed arm, h, connecting rods, i and m guard, k, lever, l, spring, m, and fulcrum p, when used in combination with the movable deflecting planes or panels, d, substantially for the purposes set forth.

51,608.—Car Coupling.—Loring Moody, Malden, Mass.:

I claim the arrangement and combination of the projection, f, and the slot, g, with the gravitating tripper and its supporting pin or fulcrum.

Also the construction of the lower or heavier arm of the tripper with the notch, e', arranged in it, as and for the purposes hereinbefore set forth.

51,609.—Metallic Ruler.—David Munson, Indianapolis, Ind.:

I claim the improvements herein described and shown at the letters, a b c d f and g, when formed, constructed and arranged substantially as set forth.

51,610.—Safety Valves for Steam Generators.—Samuel Nowlan, New York City:

First, I claim a safety valve for steam generators, constructed and arranged for operation, substantially as herein shown and described.

Second, I claim the combination with the movable valve-piston provided with steam channels as described, or the hollow piston rod and helical spring, when arranged for operation as herein set forth.

51,611.—Lamp Wick.—Person Noyes, Lowell, Mass.:

I claim a wick for lamps, composed of a case or covering, B, formed of a closely knit or woven fabric filled with loose longitudinal fibres, A, substantially as and for the purpose herein set forth.

51,612.—Portable Refreshment Fountain.—Augustus J. Ohme, Hamilton, Ohio:

I claim the steadying plate or frame, B, constructed as described, or devices substantially equivalent.

51,613.—Cover for Fruit Jars.—T. G. Otterson, Port Elizabeth, N. J.:

In combination with a fruit jar can, bottle or other similar article, having a conical shaped neck a cover, with a molded india-rubber or other elastic ring formed of one piece and extending around both the outside and inside of its edge, substantially as herein described and for the purpose specified.

[This invention consists in using in connection with a fruit jar, bottle, can or other similar article, having a conical shaped neck a cover made of metal, glass or other suitable material, with and extending entirely around its edge, both on its outside and inside, a molded india rubber or other elastic ring, in contact with the jar, the principal object of which is to enable an air-joint to be formed by the cover with the jar, when the cover is applied to it while at the same time, it can be easily and readily removed if desired to use any of the material contained in the jar.]

51,614.—Broom Clasp.—Samuel Parr, Boston, Mass.:

I claim the said broom contractor, as composed of the spring clasps, B, C, formed arranged and connected in manner and so as to be applied to a broom, substantially as and by means as hereinbefore specified.

51,615.—Hay and Cotton Press.—Charles H. Parshall, Detroit, Mich.:

First, I claim operating the beater, B, and elevating the platen D, by means of a hydraulic press constructed substantially as set forth.

Second, In combination with the beater, B, and platen, D, as above described, I claim the pawls J J, and doors, N N, secured and constructed as and for the purpose set forth.

Third, In an apparatus for compressing hay or cotton as described, I claim the construction and arrangement of the various parts constituting the hydraulic press as specified.

51,616.—Umbrellas.—John H. Parsons, Quincy, Mich.:

I claim the arrangement herein described of the knuckle joints, the conical and tight slides, the ferrules and the detachable and folding staff, substantially as described.

51,617.—Wrench.—J. W. Penney, and E. M. Thurston' Mechanics Falls, Me.:

I claim as an improved article of manufacture, the screw wrench herein described, consisting of the slotted shank, B, stationary jaw, movable jaw, D, neck, d, screw G, milled head, F, and step, E, all constructed and arranged as and for the purposes specified.

[This invention consists in the arrangement of a movable jaw having a neck which works in a longitudinal slot in the shank of the wrench, and a head on the other side to keep it in place, in combination with a screw-threaded rod working in the movable jaw, having a nut on the other end, which sets up close to a projection on the wrench, stock or shank, and which forms a bearing for the journal of the nut to work in.]

51,618.—Knitting Machine.—John Pepper, Lowell' Mass.:

First, I claim the plate, F, for holding the cylinder and needles, both in their proper places, said plate fitting into a groove in the cylinder, substantially as described.

Second, I also claim the making of the thread guide in whole or in part in the same piece or part that constitutes the pushers, substantially as described.

51,619.—Shaft Coupling or Clutch Pulley.—Elisha O. Potter, Pawtucket, R. I.:

I claim the introduction of a spring or springs in the pulley or clutch for the purpose of relieving the jar or concussion when one portion of the clutch is brought in contact with the other portion, substantially as and for the purpose set forth.

I also claim the disk, C, with its inclines, D, and dogs, F, in combination with the pulley, A, and springs, G, substantially as described.

51,620.—Felly Clamp and Spoke Support for Carriage Wheels.—J. C. Plumer, Boston, Mass.:

First, I claim the combined felly clamp and spoke support when provided with the perforated plate or inside shoulder, and applied substantially as and for the purposes specified.

Second, I claim at the junction of spoke with felly, the combined double shoulders of spoke and spoke support, as and for the purposes described.

Third, I claim the combination of the felly clamp and spoke support with an elastic packing at the joints of the spokes and fellies of carriage wheels.

51,621.—Key Guard for Locks.—J. M. Rix, Boston, Mass.:

I claim the rack bar, A, provided with the face plate, B, and projecting bar, C, in connection with the case, D, provided with the pawl F, and strips, G G, with hooks, i i, and the slide, E, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved device to prevent locks being illegitimately opened by operating from the outside of the door, upon a key inserted in the lock at the inner side of the door, a means frequently resorted to by burglars and thieves to affect an entrance into a house or into an apartment thereof.]

51,622.—Steam-engine Piston.—Frank J. Roth and David R. Gamble, New York, Ohio:

First, I claim the construction of a piston with one or more movable followers, which encircle the hub of the piston head and act to expand the packing by pressure upon their outer faces, substantially as described.

Second, I claim the combination of followers of disk form with a fixed piston head and an expansible pack, substantially as described.

Third, I claim the springs, or their equivalents, interposed between the movable followers and the fixed shoulders, a a', substantially as described.

Fourth, I claim the combination of the fixed plates or shoulders, a a', with the movable followers, C C, and the fixed piston head, B, substantially as described.

Fifth, I claim the combination of the movable beveled ollowers, C C, with the beveled segments, g, and the segments, h, substantially as described.

51,623.—Combination of Envelope and Letter Sheet.—Charles Rowland, Clinton, Ill.:

I claim a combined envelope and letter sheet, formed of the sheet, A, and flaps, B B C C, arranged in the manner substantially as herein shown and described.

51,624.—Bed Bottom.—Charles H. Sawyer, Hollis, Me.:

I claim, in combination with the loosely-supported slats, a separate arm at each end of each of such slats, each slat being supported on two of said arms, and each arm being supported at its inner end on a spring, and being so hinged at its outer end as to be incapable of other than vertical movement, substantially as set forth.

51,625.—Drawer Fastening.—James Serrill, Philadelphia, Pa.:

I claim, in combination with a till drawer, the supplemental drawer, C D, catch spring, E, and drop pin, F, constructed and arranged so as to operate together, substantially as and for the purpose described.

51,626.—Mode of Starting Railroad Cars.—Thomas R. Sinclaire, New York City:

First, I claim the arrangement of a single spring, connected by the shaft and gearing with the axles of the wheels, to operate in the manner substantially as and for the purbose set forth.

Second, I claim the sliding clutch, F, in connection with the gears, E I, when arranged with a spring or springs, J, substantially as and for the purpose specified.

Third, I claim the levers, G G', connected with the clutches, F and applied to the truck, substantially as described, when used in connection with the gearing and spring or springs, as and for the purpose set forth.

51,627.—Manufacture of Water Pipe.—Robert Skinner, San Francisco, Cal.:

I claim the constructing of water pipes by the use of layers of paper or cloth dipped and saturated in resinous or tarry substances mixed with mineral, earthy, and carbonaceous matter, in about the proportions herein specified and for the purpose set forth.

51,628.—Revolving Fire-arms.—Eben T. Starr, New York City:

First, I claim the cartridge guard, C, constructed, applied, and operating under the control of a spring, d, substantially as hercin specified.

Second, I claim the ejecter, E, arranged to operate in the arc of a circle in rear of the cylinder on one side of the frame of a revolving fire-arm, and operating substantially as herein set forth.

51,629.—Gun Lock.—Eben T. Starr, New York City:

First, I claim the construction of the trigger, the lever for drawing back the hammer, and the sere in one piece, or, in other words, making a single piece serve the three purposes of a trigger, a lever for drawing back the hammer, and a sere, substantially as herein specified.

Second, I claim the employment, for the purpose specified, of a pin, D, applied to work in a hole drilled transeversely through the tumbler, substantially as herein set forth.

51,630.—Punching Machine.—J. Steadman, Pecatonica, Ill.:

I claim, in machines for punching holes in metal, the combination and arrangement of the link, G, which drives the socket and punch, F E, with the right-angled lever, I H, working on the rock shaft, R, and the connecting rod, J, arms, K N, working on the rock shaft, L, and the link, O, and hand lever, P, substantially as described.

51,631.—Broom Head.—Samuel D. Thurston, Somerville, Ohio:

I claim, First, The crescent-formed metallic sheath, A A' A" a, and tightening straps, D F G E F' G', adapted to operate in conjunction with a tapering screw-pointed handle, in the manner set forth.

Second, I further claim the combination with the parts specified in the foregoing clause, the barbs, H H, applied and operating as and for the purposes set forth.

51,632.—Three-horse Draft Equalizer.—Edwin J. Toof, Fort Madison, Iowa:

I claim the combination and arrangement of the short double-tree or lever, B, with the levers, C and D, and the rods or chains, c f and b g, operating substantially as and for the purpose specified and shown.

51,633.—Mitering Machine.—George Trimble, Philadelphia, Pa.:

I claim the graduated base, A, and its adjustable guide pieces, F and F', in combination with the vertically adjustable frame and its slot for guiding the saw, the whole being constructed, arranged, and operating substantially as and for the purpose herein set forth.

51,634.—Wash Board.—Chas. H. Warren and A. C. Baldwin, Tiffin, Ohio:

I claim the improved new article of manufacture herein described, to wit, a wash board with corrugated metal covering, E, grooved back board, A, and grooved side strips, R B, all in the manner and for the purpose herein described.

51,635.—Railroad Box Rail.—Owen G. Warren, New York City:

First, I claim the combination of the bed rail with the track rail, to form the box rail, substantially as described.

Second, The use of the channels, G, and those formed by F with A, for locking the two parts of the box rail firmly together, substantially as described.

51,636.—Device for Shrinking Tire.—C. Weitman, Hazelton, Iowa:

I claim the combination of the hooked lever, B b, hook, C, arm, D, chain, E, bed plate, A, and fulcrum, a, all constructed, arranged, and employed in the manner and for the purposes herein set forth.

[This invention consists in the employment or use of a lever, hook, and a chain, arranged with a suitable bed piece, in such a manner that tires for wheels, and other metal bands, may be contracted or diminished in diameter, without cutting and rewelding them, and the work performed expeditiously and by a uniform contraction throughout the whole circumference of the tire or band, thereby avoiding the increased thickness now caused at particular parts, owing to the contraction of upsetting being confined at a particular place.]

51,637.—Quartz-grinding Mill.—Zenas Wheeler and Phineas Munsell Randall, San Francisco, Cal.:

We claim the conical muller or runner, C, constructed substantially as described, that is, with openings, o o, to admit the substance to be treated, and also with openings to secure the shoes, c; and in combination with the runner or muller, C, we claim the stationary conical bottom, B, fitted to receive the dies, a, substantially as described.

51,638.—Furnace Door.—John Wickersham, Baltimore, Md.:

I claim the combination and arrangement of the blank slide, A, and perforated door, B, whereby to regulate the supply of air over a fire bed, without affecting the velocity or blast, at the same time preserving the molecular currents, which secure a large gain of chemical force.

51,639.—Keeper for Door Locks.—S. B. Williams, Leavenworth City, Kansas:

I claim making the keepers of door and other locks adjustable to compensate for the expansion and contraction of doors and door casings, substantially as above described.

[This invention has for its object to compensate for the shrinking and swelling of doors, by means of a peculiar construction of door locks, and it consists in making the catch or keeper of a lock adjustable horizontally, so that it can be brought nearer to or further from the lock, as occasion requires.]

51,640.—Marine Propeller.—William D. Wilson, Newark, N. J.:

I claim the construction of the propelling shaft and vanes and the reversing shaft and stops, substantially as described.

51,641.—Stove for Heating Irons for Tailors' and Hatters' Use.—Charles Woodberry, Boston, Mass.:

I claim the within-described open stove, with its balanced weighted cover, F, arranged and operating substantially as described.

And in combination with the above, I claim regulating the hight of the grate so as to vary the size of the fire pot, by two or more holes, f g, on each side, to receive the bearings of the grate, substantially as set forth.

51,642.—Manufacture of Rubber for Dental Purposes.—Isaac Woodworth, New Haven, Conn.:

I claim preparing rubber for dental purposes, substantially in the manner as herein set forth.

51,643.—Band Machine.—Arcalous Wyckoff, Elmira, N. Y.:

First, I claim compressing simultaneously the two ends of a hollow cylinder of wood by the action of a press upon tapering rings, substantially as described.

Second, The metallic rings, B B', with chambered recesses, C C, in combination with a press, substantially as and for the purpose set forth

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51,644.—Furniture Spring.—William C. Wyckoff, Brooklyn. N. Y.:

First, I claim the cross rods, b, in combination with a spring, A, provided with a guiding rod, B, substantially as specified.

Second, I claim making the coils, c c, or an equivalent thereof, in the cross rods, b, as a bearing for the guiding rod, B substantially as specified

51,645.—Cloth Guide for Sewing Machines.—Ferdinando Zuchetti, New York City:

I claim a gage for a sewing machine composed of a supporting bar, t, and hinged adjustable guide, g, in combination with an arm, d, extending from the presser foot, A, substantially as and for the purpose described.

[This invention relates to a gage for sewing machines which is adjustable on an arm extending from the presser foot or from the bar to which the presser foot is secured, and which is composed of a supporting piece and a hinged guide, which is adjustable up and down in such a manner that a gage is obtained which can easily be regulated according to the width of the seam and according to the thickness of the material passing through under it, and which rises and falls with the presser foot, so as to cause no resistance to the feed motion of the material to be sewed.]

51,646.—Sand Distributor for Railway Cars.—Chas. M. Bromwich (assignor to himself and John R. Taft), South Boston, Mass.:

I claim attaching to and upon the under side of railway cars, and in front of the wheels thereof, boxes of receivers for sand or other suitable gritty substances, constructed and arranged in such a manner as to be opened or closed at pleasure, substantially as described and for the purpose specified.

[This invention consists in securing to and arranging upon and underneath the car, in front of each of the wheels, a receptacle or receiver for sand or other gritty substances, closed at its lower end by a partition plate or lid, so arranged and connected with a lever handle of the platform of each end of the car, that by moving one of the said levers in the proper direction, either to the right or left, as the case may be, the lids of the receptacles at the corresponding end of the car thereto, can be so opened as to allow the sand to fall therefrom to and upon the rails; the lids being closed by a simple reverse movement of the said lever, when a sufficient quantity or amount of the sand has been thus spread upon the rails.]

51,647.—Table-leaf Support.—Daniel Bull (assignor to himself and John B. Edoms), Amboy, Ill.:

I claim the herein-described arrangement of the hinged bracket, D, spring, E, loop, e, and catch f, all constructed as and for the purposes specified.

[The object of this invention is to provide a means for keeping extended the leaves of tables, etc., in a better, firmer, and more quickly adjustable manner than heretofore, and the invention consists in the employment of an arm hinged to the table leaf, and arranged to bear against the frame of the table underneath the same, which will brace up the leaf when properly adjusted, and which can be released in a moment, in order to lower the leaf, and be concealed when the leaf is down.]

51,648.—Cutlery.—Calvin L. Butler (assignor to J. Russell Manufacturing Company, Greenfield, Mass.:

I claim forming the bolster of a knife, fork, or other article of cutlery in two parts or sections, each having upon their inner surface a projecting teat or prong, which, passing through a suitable shaped slot, in the knife, etc., are clinched upon the same, substantially as herein described and for the purpose specified.

I also claim the concavities or depressions about the bolster prongs, as and for the purpose described.

[This invention relates more particularly to knives and forks for table use, and consists in a novel construction or formation of the bolster, and also in its atrachment to the knife and fork.]

51,649.—Base-burning Coal Stove.—David B. Cox (assignor to Cox, Church & Co.), Troy, N. Y.:

First, I claim the removable magazine, C, in combination with the air chamber, G, at its lower end, substantially as and for the purposes set forth.

Second, I claim the chamber. G, with its perforations in combination with the tubes, D D, or equivalent, substantially as set forth.

51,650.—Combined Hay Spreader and Elevator.—Thos. C. Craven (assignor to self and William H. Davis), Albany, N. Y.:

First, I claim the mode herein specified of forcing hay or similar material up a trunk or chute by a revolving mechanism placed at the lower end of said trunk, to act continuously in raking up and elevating the hay, grass, or other material, substantially as specified.

Second, I claim a revolving rake, composed of a cylinder, with teeth projected and retracted by an eccentric movement, as set forth.

Third, I claim the revolving cylinder, armed with rake teeth, in combination with the trunk, h, wheels, b, and gearing, e f, as and for the purposes specified.

51,651.—Fish Hook.—William Davis and Job Johnson (assignors to Job Jonnson), Brooklyn, N. Y.:

We claim the shank, e, formed with an eye sliding upon one of the fish hook shanks, b, in combination with the eye, d, turned in the other fish hook shank, as and for the purposes specified.

51,652.—Machinery for preparing Flax.—Jim B. Fuller, Claremont, N. H., assignor to himself and J. P. Upham of same place, and E. T. Rice, New York City:

I claim the grating or screens contiguous to and in combination with a series of strippers and workers fitting and acting substantially as specified and for the purposes set forth.

51,653.—Pump Valve.—Charles B. and John Hardick (assignors to Albert B. Campbell), Brooklyn, N. Y.:

First, We claim the polygonal valve, guided at its ends by openings in the side of the valve chest, in combination with the spring or springs applied to close said valve, in the manner and for the purposes set forth.

Second, We claim the arrangement of the induction and eduction passages, the latter being fitted with the division, o, in combination with polygonal valves, arranged as set forth.

51,654.—Journal Box.—S. B. Higgins (assignor to himself, E. C. Coleman and John Brown), South Boston, Mass.:

I claim a journal box with detachable end pieces, C, constructed substantially as described, and for the purpose set forth.

[This invention consists in casting the inwardly projecting ends of the journal box, which confine the Babbett metal, and which receive the most of the wear, separate from the main body of the box, so that when worn they may be removed and replaced with new end pieces, the expense of renewing the entire journal box being avoided.]

51,655—Tanning Apparatus.—Henry Lieberman (assignor to himself and Philip Nun, Jacob Well and George Rock), Paducah, Ky.:

I claim, First, the reciprocating truck frames, B, carrying the baskets C, in combination with suitable pits and with a crank, or its equivalent, constructed and operating substantially as end for the purpose described.

Second, The use of closely-framed baskets, E, for the purpose of facilitating the operation of leaching bark and putting away the leather, as set forth.

51,656—Slide Valve for Steam Engines.—Abner W. Jones, (assignor to N. D. Morgan), Brooklyn, N.Y.:

I claim the combination of the cylinder, K, and the cylinder, P, with the spring, M, so constructed and arranged as to balance the pressure of the steam and hold the valve to its seat, substantially as herein described and for the purpose set forth.

51,657—Flour Sifter.—Henry L. Meservey (assignor to himself and Horatio Fairbanks, and assignor by mesne assignment to Howard Tilden), Boston, Mass.:

I claim a revolving frame carrying a series of roller, E, in combination with a box or hopper, A, and sieve, B, substantially as and for the purpose set forth.

51,658—Broom Head.—Charles E. Miller (assignor to himself and Frank Dial), Cincinnati, Ohio.

First, I claim the combination of the socket, A, shell, C, arms, D D', bows, E F, clasps, G H, and links, I, L', when constructed and arranged to operate as and for the purposes specified.

Second, I further claim the arrangement of the alternate long and short teeth, I J, upon both the bars. E and G, as and for the purposes specified.

51,659—The Manufacture of Bread.—J. G. Moxey (assignor to himself, Henry C. Carey, and Abraham Hart), Philadelphia, Pa.:

I claim injecting into a closed vessel containing flour, an aqueous ferment, charged with carbonic acid gas, for the purpose specified.

51,660—Bit Holder for Braces.—Milton V. Nobles, Rochester, N. Y. (assignor to himself and John C. Nobles), Rushford, N. Y.:

I claim in combination with a solid socket and split sleeve and its tightening ring, which of themselves form an independent bit or tool holder, the additional holding devices composed of the screw thread on the socket and the sectional screw threads in the sleeve, substantially as and for the purposes described.

51,661—Adjustable Link.—Frank Pfeiffer, Giesboro, D. C., assignor to Charles F. Palmer, Norfolk, Va.:

I claim the shape and construction of the open link formed by the combination of four hooks operating on a center pivot, as herein described and for the purposes set forth.

51,662—Apparatus for Separating and Concentrating Ores.—Edward L. Seymour (assignor to Charles Raht), New York City:

First, I claim the previous diaphragm arranged at the lower end of a shallow receptacle or basin, whether funnel-shaped or otherwise, in combination with the devices for causing a current of air or water to pass through it and for feeding it with material, as set forth.

Second, I claim the construction of the shallow receptacle or basin, whether funnel-shaped or otherwise, in such manner that the position of the said receptacle may be readily altered for the purpose of discharging the concentrated material, substantially as set forth.

51,663—Broom Head.—Aaron Slivers, Collinsville, Ohio, (assignor to himself and T. L. Kenworthy, C. A. Clegg, and S. J. Walker).:

I claim the screw loop, C D, as particularly described and represented in figure 3, when used in combination with the other devices for covering the broom and its mechanism and the broom corn is inserted and held in position in the manner and for the purpose substantially as described.

51,664—Gas Regulator.—Warren A. Simonds (assignor to the American Gas Machine Company), Boston, Mass.:

I claim a dry-gas regulator, the combination of the flexible cylinder, C, and its disk, g g, with the regulating valve, I, so arranged as to increase or diminish the area of the supply channel, H, or delivery channel, E, as the demand for the gas through said ceannel, E, is increased or diminished, said valve being operated by the predominant of two counteracting forces, viz.: the pressure of the gas on disk, g g, and the cord, d, and weight, E, substantially as described.

51,665—Clutch for Connecting and Disconnecting Machinery.—David M. Smyth (assignor to himself and P. C. Schuyler), New York City:

First, I claim the turning stop with its spring arm and located at the junction of the shaft and hub of the wheel, and made partly in the periphery of the shaft and partly in the inner periphery of the hub, substantially as described, in combination with the spur or the equivalent thereof for turning the stop, substantially as described.

Second, And I also claim the friction strap and friction wheel in combination with the clutch, substantially as and for the purpose specified.

51,636—Knitting Machines.—Samuel Wallis (assignor to himself and John Pepper), Lowell, Mass.:

I claim the narrowing or forming of the toesof stockings or the ends of mitts, in machine-knit goods and on the flat or open frame by means of a contractible and expansible presser without moving the loops on the needles, and by throwing out of into action said needles, substantially as herein described.

51,667—Machinery for Manufacturing Sheet Metal Boxes.—William Wilson, Jr. (assignor to himself and Charles Green), Wilmington, Del.:

First, I claim the toothed rims, N, in connection with the rollers, T, attached to sliding bars which are placed on a hinged or adjustable frame O, substantially as and for the purpose set forth.

Second, I claim the combination of the toothed rims, N, with the cylindrical projections, M, attached to plates, H H', one of which is adjustable and all arranged substantially as described for the purpose of clamping the box properly while being operated upon, and at the same time admitting of the rims, N, adjusting themselves with the wheels, E, into which they gear, substantially as described.

51,668.—Imitation of Embroidery.—Bernhard Muller, Fulda, Germany, assignor to Schack & Hatop, New York City,

I claim the new article of manufacture, consisting of cloth with small square elevations on which a design is painted or printed, substantially as described, for the purpose of thereby obtaining an imitation of embroidery on canvas.

51,669.—Paper-cutting Machine.—Wm. Smith, Windham, Conn., executor of the estate of E. P. Beckwith, deceased:

First, I claim the combination, in a paper-cutting machine, of a gradually starting and gradually stopping intermittent feed mechanism with a revolving knife, substantially in the manner and for the purposes specified.

Second, The within-described arrangement of the revolving knife, b, crank, B2, connection, D, segment, E, and intermittent feeding drum, G, substantially as and for the purpose specified.

Third, The friction pawls, G3, arranged substantially as specified, to transmit motion from the sleeve, F', revolved alternately in opposite directions to the feeding drum, G, of a paper-cutting machine.

Fourth, The pendulous piece, C, arranged relatively to the knives, a and b, and to the intermittent feeding mechanism, G H, or its equivalent, in a paper-cutting machine, substantially as and for the purpose herein specified.

Fifth, The spring, K, arranged as specified relatively to the intermittent feeding mechanism, E F G, and their connections, in a paper-cutting machine.

Sixth, The friction brake, M, and spring, J, or its equivalent, in combination with the depressing arm, B4, with a rotating cutter, b, and with the wheel, G', and drums, G H, of an intermittent feed in a paper-cutting machine, substantially as specified.

Seventh, The within-described arrangement of the spring, J, brake, M, wheel, G', and the connected parts of an intermittent feed in a paper-cutting machine, substantially as specified.

Eighth, The catch or dog, N, with a releasing device therefor, in combination with the brake, M, spring, J, and suitable means for depressing the same and the intermittent feeding drums, G H, or their equivalents, in a paper-cutting machine, as specified

Ninth, The detaching cam, B5, and surface, n, arranged relatively to the cutting shaft, B, catch, N, brake, M, and wheel, G', of an intermittent feed in a paper-cutting machine, substantially as specified.

51,670.—Combined Clothes Boiler, Drainer, Etc.—Francis Browning, Watchel, Eng.

I claim a clothes receiver, B, in combination with a clothes boiler, substantially as and for the purpose herein set forth,

51,671.—Blasting by Electricity.—T. P. Shaffner, Louisville, Ky.:

I claim the use of branch circuits in separate fuses with a single charge of explosive material, for the purpose of simultaneous ignition of the same at several points, as set forth.

51,672.—Cartridge.—T. P. Shaffner, Louisville, Ky.:

First, I claim the hollow cartridge of compressed nitro-fiber af fording by its central opening a space for the introduction of the electric or other fuse or fuses, by which explosion is obtained.

Second, I claim the introduction of loose nitrated fiber in the cavity or cavities of a compressed cartridge, to assist in the dissemination of the fire from the ignited fuse or fuses.

Third, I claim the branchial or ramifying spaces, S S, irrespective of form, direction, or number, but proceeding from the fuse cavity or cavities of a compressed cartridge, for the purpose described.

51,673.—Cartridge for Blasting.—T. P. Shaffner, Louisville, Ky.:

I claim the combination of the hollow cartridge provided with fuses, as described, in its central space, and with a water-proof covering on its exterior, as and for the purpose described.

51,674.—Blasting by Electricity.—T. P. Shaffner, Louisville, Ky.:

I claim the combination of the main circuit and the branch circuits, the latter being conducted to the various points for simultaneous ignition, and being of less conductivity than the main wires by reason of smaller size, or by the interposition of resistance between their terminals, sufficiently to place the different objects under equally favorable conditions for simultaneous explosion, substantially as described.

REISSUES.

2,126—Vise for Carpenters' Use.—Orlando V. Florey, Yellow Springs, Ohio. Patented April 8, 1856.:

I claim the use of the ratchet-brace, G, operating in connection with the ratch, H, sliding beam, D, movable jaw, C, and nut, E, substantially in the manner herein set forth.

2,127—Straw Cutter.—Warren Gale and B. B. Belcher, (assignees of Warren Gale), Chicopee Falls, Mass. Patented December 18, 1860. Reissued May 30, 1865.:

First, I claim the mouth-piece, A, constructed and attached substantially as described and provided with a cutting edge, a.

Second, I claim the combination and arrangement of the mouth-piece A, constructed substantially as described and claimed, with the lever-knife F B, constructed and operating substantially as described.

Third, I claim the step, C, constructed and operating substantially as described when used as a support for the chopping lever-knife, F B, and its fastenings, for the purpose of obtaining angular adjustment.

Fourth, I claim the combination and arrangement of the carrier, C, and the flange of the pivot, D, provided respectively with the longitudinal slot, and with the bolt hole, b, and transverse slot, c, for producing the adjustments desired, substantially as herein specified.

2,128—Locomotive Lamp.—Jonathan Mayhew and Thomas S. Ray (assignees of J. Stuber and F. Frank), Buffalo, N. Y. Patented April 23, 1861.:

First, We claim in a kerosene or coal-oil lamp, constructed and used for a head-light for locomotive engines, we claim a perforated shell, L, (or equivalent) through which the air is strained before it reaches the flame in combination with a cylindrical wick tube, B G, and deflector, N, for the purposes and substantially as described.

Second, We also claim an outside hollow cylinder, J, (with or without the air tubes, K,) in combination with a cylindrical wick tube, B G, deflector, N, and perforated shell, L, for the purposes and substantially as described.

Third, We claim the combination of the shield, M, with the perforated shell, L, forming an air chamber, L2, between them, as substantially as described.

Fourth, We claim admitting air through a perforated cylinder or shield, J, to the outside of the deflector and between the deflector and chimney, in a lamp having a cylindrical wick tube, and used for a head light for locomotive engines, substantially as set forth.

Fifth, The double perforated button, P, in combination with a cylindrical wick tube, substantially as set forth.

Sixth, In a kerosene or coal oil lamp for head lights for locomotive engines, having a cylindrical wick tube, over which the wick is drawn, and having a cylinder outside of that which, with the wick tube, form an annular chamber, we claim extending the chamber downwardly by means of the tube. I, so as to make room for the full working of the rack bar within the oil chamber, substantially as described.

2,129.—Machine for Tunneling and Quarrying.—Arthur Maxwell (assignee of Ira Merrill), Shelburne Falls, Mass. Patented April 22, 1856:

First, I claim the cutting or forming of channels in rock by the use of chisels, or cutting tools, that have two combined movements, viz: a reciprocating movement to and from the rock, and a lateral movement in the line of the channel or channels to be cut, substantially as herein described.

I also claim a stone-cutting channeling machine which is constructed to be moved up to the rock, and provided with reciprocating cutters which are supported in standards arranged on the out side of the frame, substantially as described.

I also claim the combination of two or more cutters in gangs, connected together by means of head and foot clamps, which are adapted to slide freely between standard guides that are supported on one side of the frame of the machine, substantially as described.

I also claim making the chisels reversible on the frame so as to cut two or more sets of channels without moving the machine, substantially as described.

I also claim in combination with the backward and forward movement of the cutters, the advancing movement of the main frame to feed the chisels up to their work, substantially as described.

I also claim securing the chisels together in gangs, by clasps or clamps which hold them in proper working position, and allow them to be removed at pleasure, for repairing or redressing, substantially as described.

I also claim the mechanism for giving the chisels or cutters their lateral motion in the line of the channels to be cut, it being composed substantially of the levers, links, and lifting bar operated through a flexible cord or chain, substantially as described.

I do also claim the use or employment in stone channeling machines of chisels or cutting tools that have a series of straight parallel or oblique edges in combination with one or more reversed cutting edges to remove any roughness from the sides of the channels, substantially as described.

2,130—Steam Boiler.—Robert E. Rogers and James Black, Philadelphia, Pa. Patented January 19, 1864.

First, We claim the body, A, of the boiler having tubes, B and B', so arranged that they will maintain a continuous circulation of water between the upper and lower portion of the boiler, when the whole or very nearly the whole of the boiler is suspended within a casing containing the fire chamber and is exposed to the direct action of the products of combustion, as set forth.

Second, We claim two or more sets of tubes, B or B', arranged on and attached to the body, A, of the boiler, as set forth and for the purpose set forth.

2,131—Knob Latch.—Rodolphus L. Webb, New Britain, Conn. Patented Nov. 15, 1864:

I claim the combination of the bolt, a, yoke, f, and spiral spring, e, or its equivalent, when the latter is arranged so as to subserve the two functions before described, substantially as set forth.

2,132.—Machine for Splitting Wood.—William L. Williams, New York City. Patented April 14, 1857:

First, I claim the combination of the feeding chains, arranged as set forth, with the stationary conveying floor, for effecting the feeding up of the sticks in a fire-wood splitting machine, substantially as described herein.

Second, I claim in a machine for splitting fire wood the combination of a yielding lateral support to the wood, with diagonal knives, substantially as set forth, whereby the wood confined between said knives is allowed to move laterally as the knives enter the same, for the purposes set forth.

Third, I claim communicating to said yielding lateral supports a positive motion, governed by the movement of the knives, substantially as and for the purposes specified.

Fourth, I claim in a wood splitting machine two separate knives, a an angle or diagonally to each other, and each extending across the feeding floor, so as to split up the wood in the manner specified.

2,133.—Locomotive Lamp.—Irwin A. Williams, Utica, N. Y. Patented April 29, 1862:

First, I claim the combination in a lamp of the following members

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viz.: the circular hollow wick tube, perforated air screen for the exterior current of air, and cap deflector, substantially as set forth.

Second, The combination in a lamp of the following members, viz.: the circular hollow wick tube, perforated air screen for the exterior current of air, cap deflector and lateral oil reservoir, substantially as set forth.

Third, The combination in a lamp of the following members, viz.: the circular hollow wick tube, perforated air screen for the exterior current of air, cap deflector and button, substantially as set forth.

Fourth, The combination in a lamp of the following members, viz.: the circular hollow wick tube, perforated air screen for the exterior current of air, cap deflector and thimble wick holder, substantially as set forth.

Fifth, The combination in a lamp of the following members, viz.: the circular hollow wick tube, lateral oil reservoir and perforated air screen for the current of air in the interior of the wick tube, substantially as set forth.

Sixth, The combination in a lamp of the following members, viz: the circular hollow wick tube, perforated air screen for the interior current of air, lateral oil reservoir, and cap deflectors, substantially as set forth.

Seventh, The combination in a lamp of the following members, viz: the circular hollow wick tube cap deflector, perforated air screen for the interior current of air and button, substantially as set forth.

Eighth, The combination in a lamp of the following members, viz: the circular hollow wick tube, cap deflector, lateral oil reservoir, perforated air screen for the interior current of air and button, substantially as set forth.

Ninth, The combination in a lamp of the following members, viz: the circular hollow wick tube, cap deflector, and perforated air screens for both the exterior and interior currents of air, substantially as set forth.

Tenth, The combination in a lamp of the following members, viz: the circular hollow wick tube, cap deflector, perforated air screen for the exterior current of air and close chimney gallery, substantially as set forth.

Eleventh, The combination in a lamp of the following members, viz: the circular hollow wick tube, thimble wick holder, cap deflector, button, perforated air screens for the exterior and interior currents of air and lateral oil reservoir, substantially as set forth.

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Improved Rolls for Car Axles.

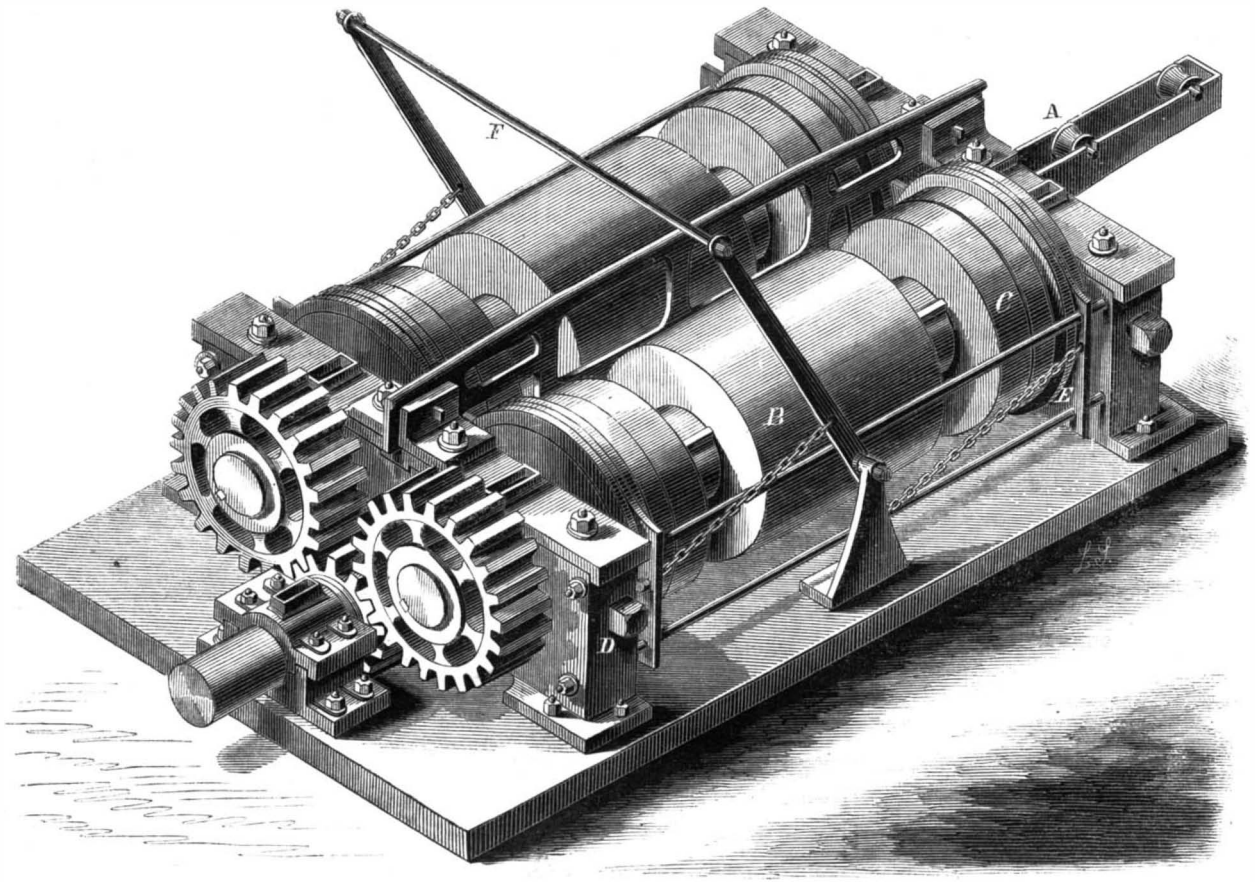
This machine is designed to roll car axles and supersede thereby the old and laborious process of hammering. The inventor says he is satisfied, after long experience, that this plan is preferable and that it produces better work. It is applicable to shafting of all kinds.

In rolling the axle, iron, cut to the proper length, is laid on the carriage, A, and inserted between the rolls at a certain time. The rolls are cams, or eccentric-shaped, and do not bite on the axle instantly, but gradually draw it in, at the same time elongating it until it is thrown out, finished, in one revolution. The parts marked B and C commence forming the axle first, and as the operation is continued, the parts C slide from B as the bar lengthens. The screws, D, are to set up the rolls to suit axles of any dimensions. The plates, E, are to draw up the end pieces on the rolls, and are worked by the lever, F. The diameter of the rolls is three feet six inches, but can be made larger or smaller. The inventor says:—

"Some may suggest that the rolled bar is not so good as the hammered bar. If you understand the operation of the rolling and hammering, you will agree that there is no difference—one operation gives the same result as the other, excepting that the rolls operate on the whole length of the bar at one time. If the bar is not well heated and welded it will show for itself. In this operation the grain of the iron is closed as if it was hammered; and I am satisfied it will prove an improvement for the reason that the less iron is heated the better it is in quality."

The patentee has been in the rolling-mill business for the last forty years, and a small-mill roller for twenty-seven years. If the operator desires he can throw the two ends out and form the middle of the axle first, and draw them together again and form the ends, or form and make all at once.

For further particulars and photograph of mill, as here shown, address Thos. Cooper, No. 76 West Third street, Cincinnati, Ohio. Patented in the United States and Great Britain through the Scientific American Patent Agency.

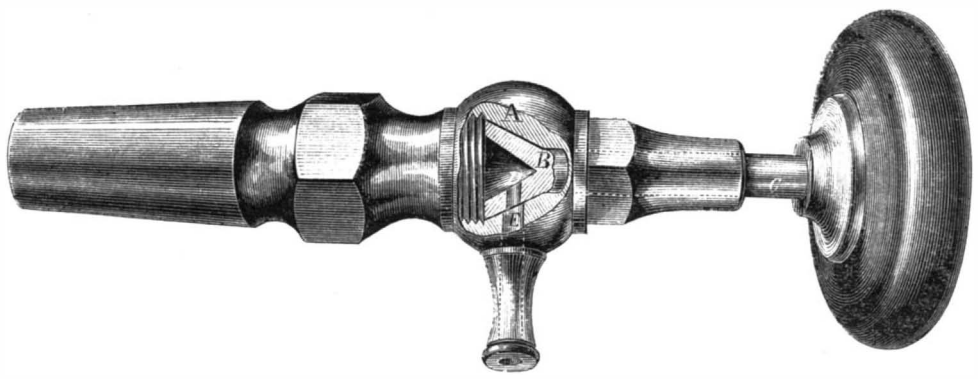


COOPER'S ROLLS FOR MAKING CAR AXLES.

Improved Gage Cock.

This gage cock is one of that class where the pressure of the steam comes on the end of the valve, and tends to keep the same tight on its seat, instead of forcing it off, as in some kinds. The construction of this cock is peculiar in other respects, also, as will be seen by inspecting the engraving. The valve is formed on the stem and is fast thereon. It has also a very long bearing, and, by its arrangement, no steam can blow through the forward end to scald the hand, or water leak through to corrode the boilers by dropping down where it is so placed that this can happen.

In detail, the cock consists of a chamber, A, bored out to form a seat for the valve, B; this has a hole, D, in it, which corresponds with one in the shell. When, therefore, the knob is turned to bring the orifice, E, in line with the hole, D, the water or steam from the boiler will issue. In all other positions the passages are closed and kept tight by the pressure in the boiler. This gage is easily cleaned when dirty, and will wear a long time



WALKER'S GAGE COCK.

It was patented through the Scientific American Patent Agency, on July 25, 1865, by E. A. Walker, of Clear Water, Minn. For further information address Hayden, Gere & Co., Haydenville, Mass., who supply orders.

Discovery of Borax in California.

The San Francisco *Bulletin* says that a lake has been found in California which contains inexhaustible supplies of the purest borax—an article worth 23 cents in gold per pound.

Borax lake, whence the article is obtained, is about two miles in circumference, surrounded by high hills, and furnishes a reservoir for the water that pours down their sides during the rainy season. In the summer season it is quite shallow and the crystallized borax is extracted from the mud on its bottom in lumps varying in size from a ten-pin to the minutest particles. After extracting these crystals the mud of the entire lake has been found to contain a large percentage of borax. The company have sunk an artesian well to the depth of sixty feet, and find the mud to contain, even at that depth, more or less borax. Recently mud taken out at a depth of several feet was analyzed by Prof. G. E. Moore, after the crystals had been extracted, and found to contain 11 1-10 per cent of borax

The quantity used in San Francisco is between 30 and 40 tuns per annum; in the whole United States, 500 tuns per annum. From 3,000 to 4,000 tuns are used annually in Great Britian, over 1,100 tuns being consumed in the potteries of Staffordshire alone. Hitherto most of the borax of commerce has been manufactured in England from boracic acid, obtained from Tuscany and the common soda. Nature's crucible does not appear to have conjoined the two substances in the form of crystallized borax, except in a very few places, and in limited quantities. It has been found in certain lakes in Thibet and in some parts of Persia and China, but the deposit at Borax lake, in California, is probably the largest hitherto discovered, and chemically analyzed proves it to be also the purest.

A Mechanical Triumph.—In Chicago, recently, an immense iron block, located on the corner of Wells and South Water streets, owned by Geo. R Robbins, of this city, eighty by one hundred and fifty feet, five stories in hight, and weighing with its contents about 50,000 tuns, was raised twenty-seven inches to the grade of the street, without wrenching a hair's breadth, and without in the least interrupting the business of the occupants. It was raised by jack screws.

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